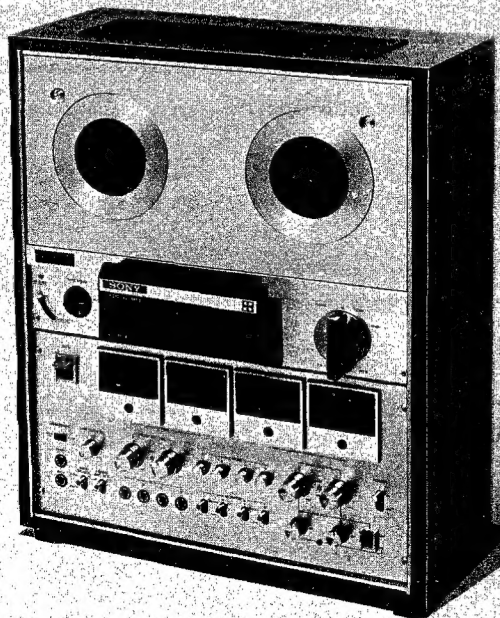


TC-388-4

USA Model
PX Model



4-CHANNEL STEREO TAPECORDER

SPECIFICATIONS

Power Requirements:	120 V AC, 60 Hz (USA Model) 120 V AC, 60 Hz (100, 110, 127, 220, 240 V AC, 50 Hz adjustable by the Sony personnel) (PX Model)	Wow and Flutter:	0.09 % at 19 cm/s (7½ ips) 0.12 % at 9.5 cm/s (3¾ ips)
Power Consumption:	40 W (USA Model) 32 W (PX Model)	S/N Ratio:	55 dB with Sony SLH tape
Tape Speed:	19 cm/s (7½ ips), 9.5 cm/s (3¾ ips)	Inputs:	Microphone inputs 4 Sensitivity 0.2 mV (–72 dB) Accept low impedance microphones Line inputs 4 Sensitivity 0.06 V (–22 dB) Impedance 100 kΩ
Recording Time:	45 min. at 19 cm/s (7½ ips) quadraphonic recording with 1,800 ft tape	Outputs:	Line outputs 4 Output level 0.775 V (0 dB) at load impedance 100 kΩ with line output volume control set to MAX Suitable load impedance higher than 10 kΩ Headphone outputs 2 Accept an 8Ω stereo headphones
Reels:	17.8 cm (7 inches) or smaller	Dimensions:	422 (w) x 505 (h) x 220 (d) mm 16⅞ (w) x 19⅞ (h) x 8¾ (d) inches
Recording System:	4-track quadraphonic, stereo and mono system	Weight:	14.5 kg (31 lb 14 oz)
Frequency Response:	With Sony SLH tape 20 ~ 30,000 Hz at 19 cm/s (7½ ips) 20 ~ 23,000 Hz (±3 dB) at 19 cm/s (7½ ips) 30 ~ 19,000 Hz at 9.5 cm/s (3¾ ips) With standard tape 20 ~ 25,000 Hz at 19 cm/s (7½ ips) 30 ~ 17,000 Hz at 9.5 cm/s (3¾ ips)		
Distortion:	1.2 %		

SONY
SERVICE MANUAL

TABLE OF CONTENTS

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*When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS.
Parts List reference numbers should not be used.*

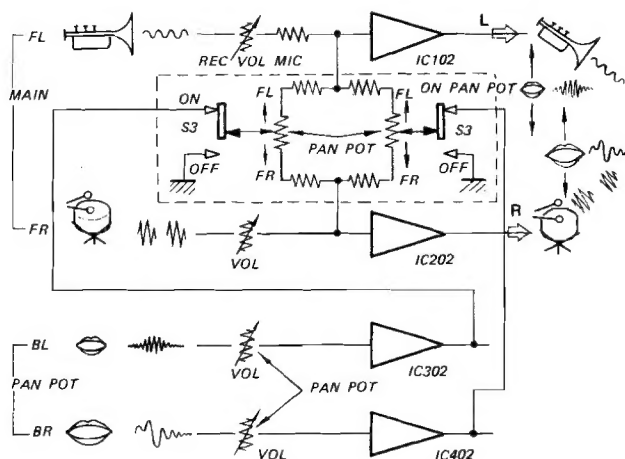
**FL: FRONT L-CH
FR: FRONT R-CH
BL: BACK L-CH
BR: BACK R-CH**

SECTION 1

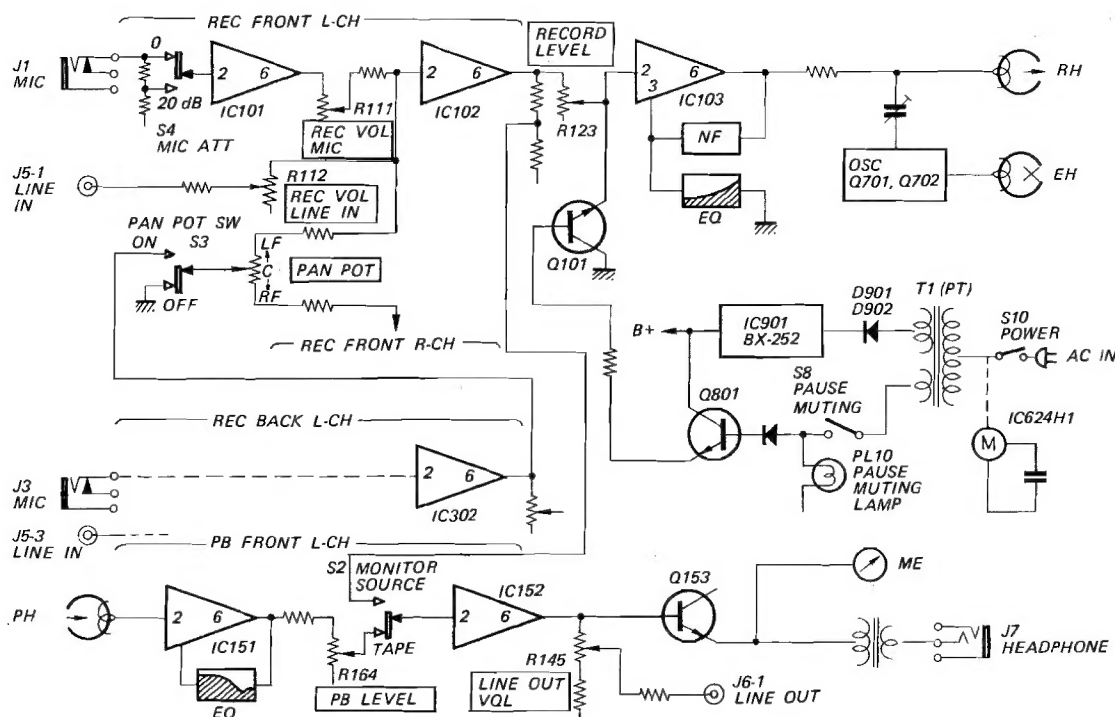
OUTLINE

1-1. PAN POT (Panoramic Potentiometer)

With PAN POT switch turned ON, the BACK channels are mixed into the FRONT channels to reproduce the two-channel stereo sounds and PAN POT controls can shift a sound image on a reproduced stereo sound field. The two FRONT channels are used for reproducing a stereo sound field and the two BACK channels for reproducing a sound image and shifting it.



1-3. BLOCK DIAGRAM

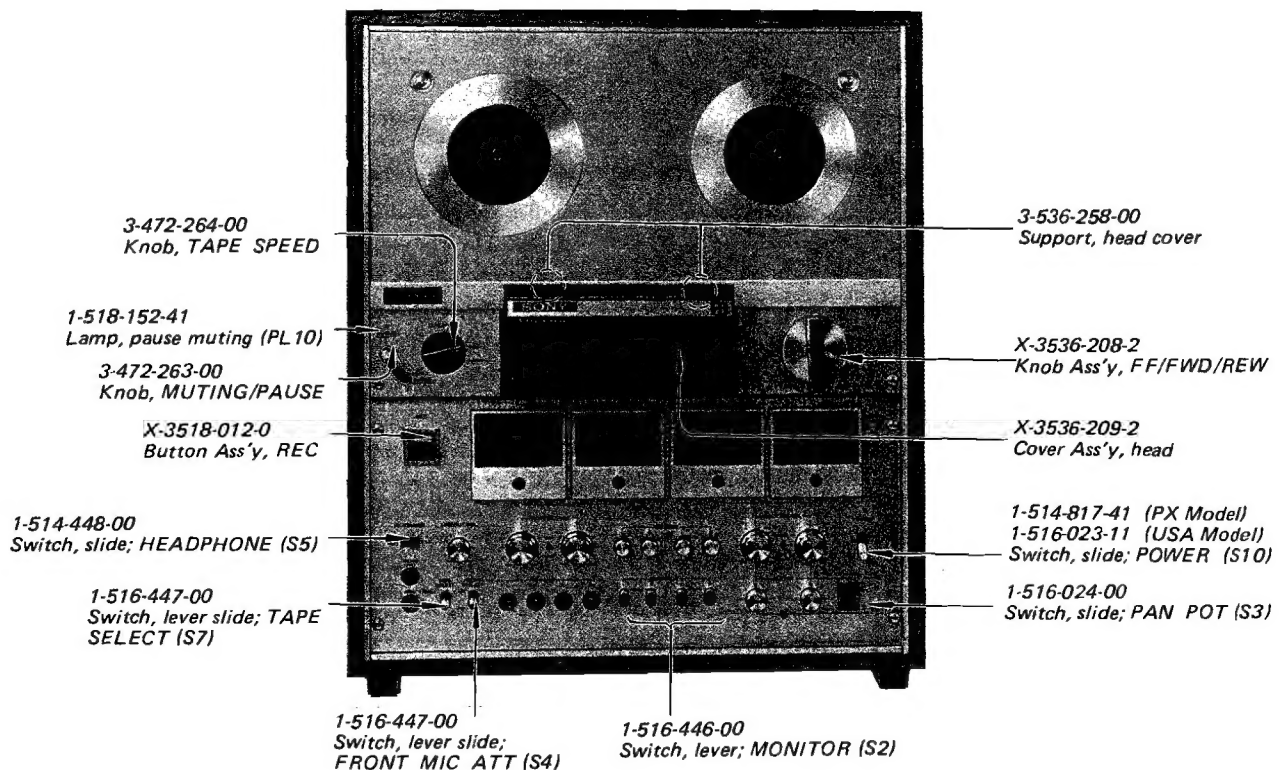


Ref. No.	Switch	Mode
S2	MONITOR	TAPE
S3	PAN POT	OFF
S4	MIC ATT	0 dB
S8	PAUSE MUTING	OFF

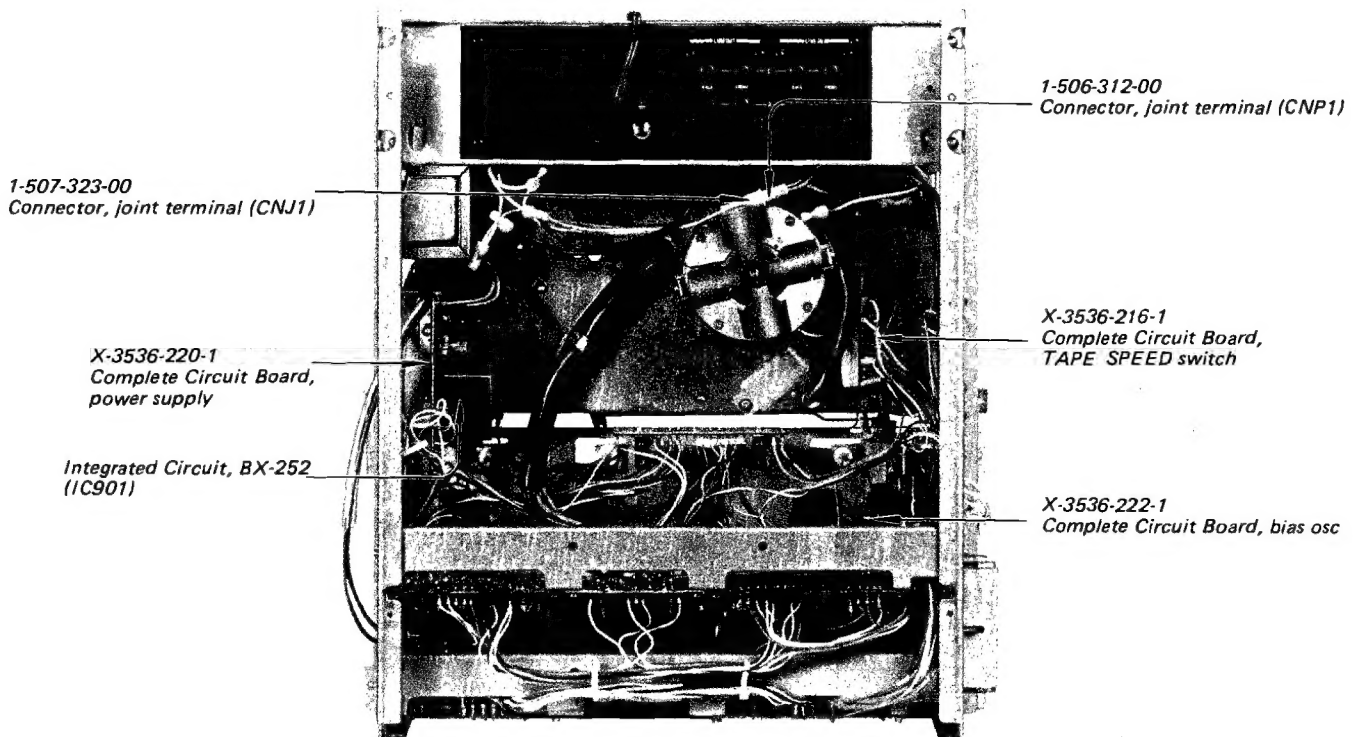
1-2. MUTING/PAUSE LEVER

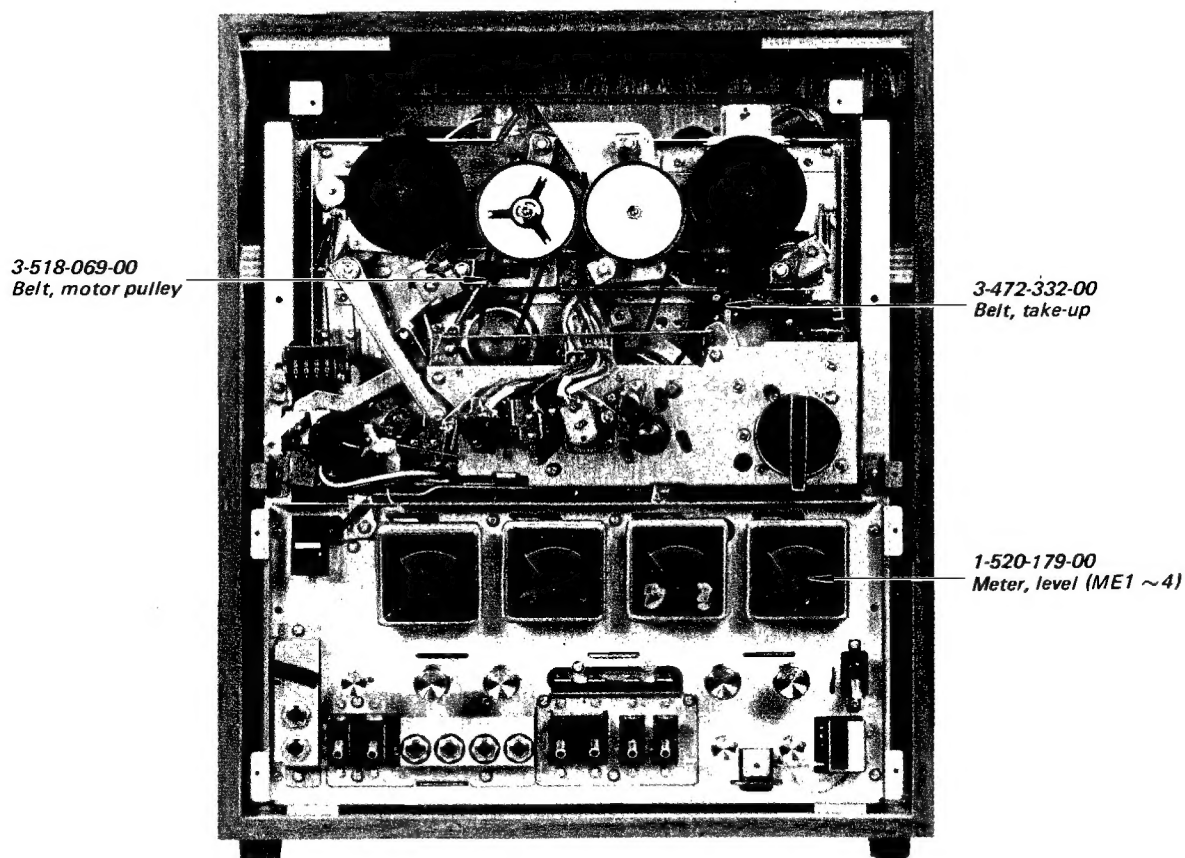
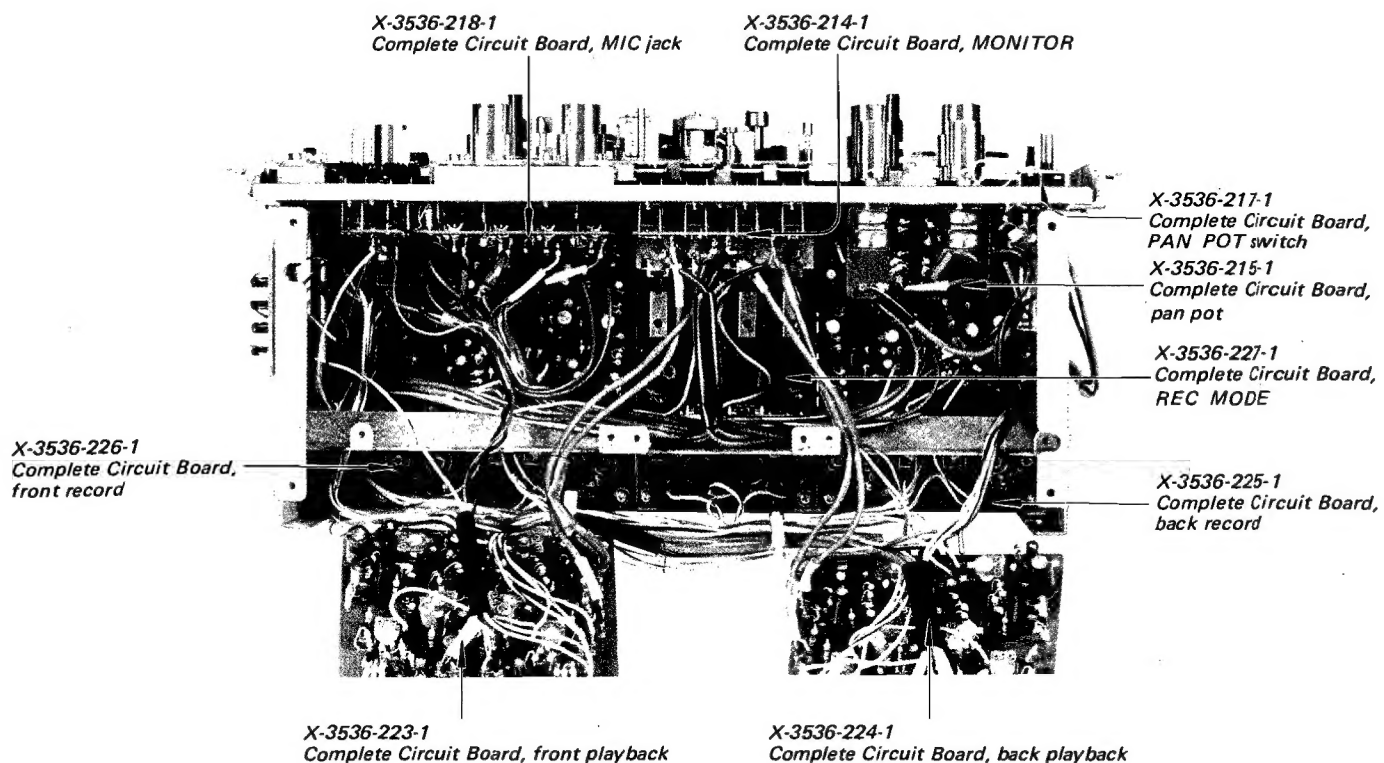
With MUTING/PAUSE lever depressed halfway, the tape transport is not in pause mode but the record signals are muted. With the lever farther depressed and locked, the tape transport is in pause mode. With the lever depressed halfway, S8 is turned ON and the base of Q801 is positive-biased, Q801 turns ON and applies B+ voltage to each base of Q101, Q201, Q301 and Q401 to mute each channel record signal. The rise time of muting is 0.1 seconds, which is determined by the time until C802 is charged up to 1.2 volts through R802. With the lever released, S8 is turned OFF and C802 discharges. The decay time of muting is 0.6 seconds, which is determined by the time until the voltage across C802 decreases into 1.2 volts.

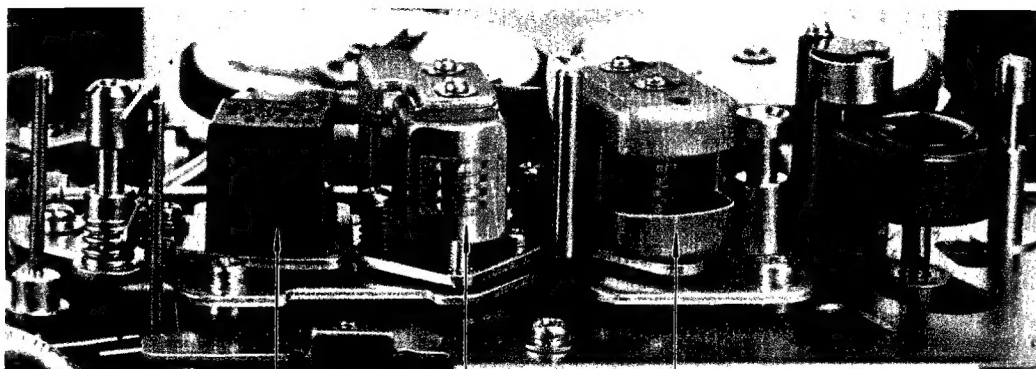
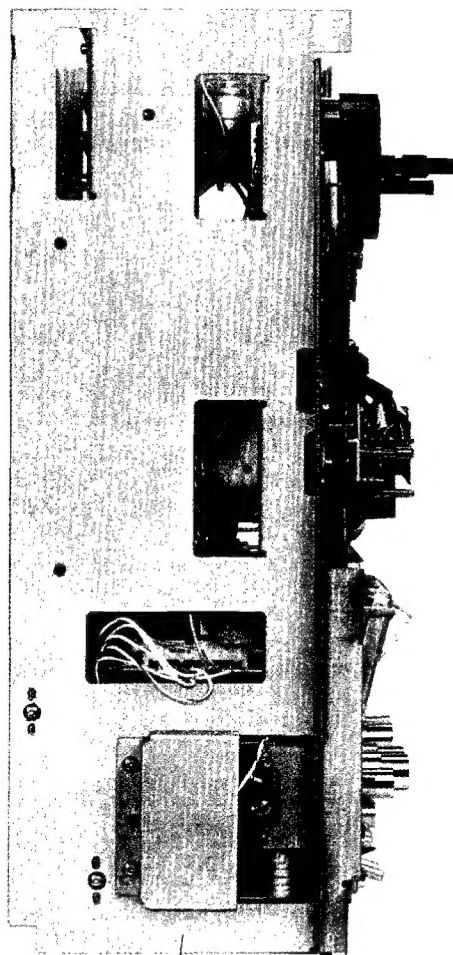
1-4. EXTERNAL VIEW



1-5. INTERNAL VIEWS





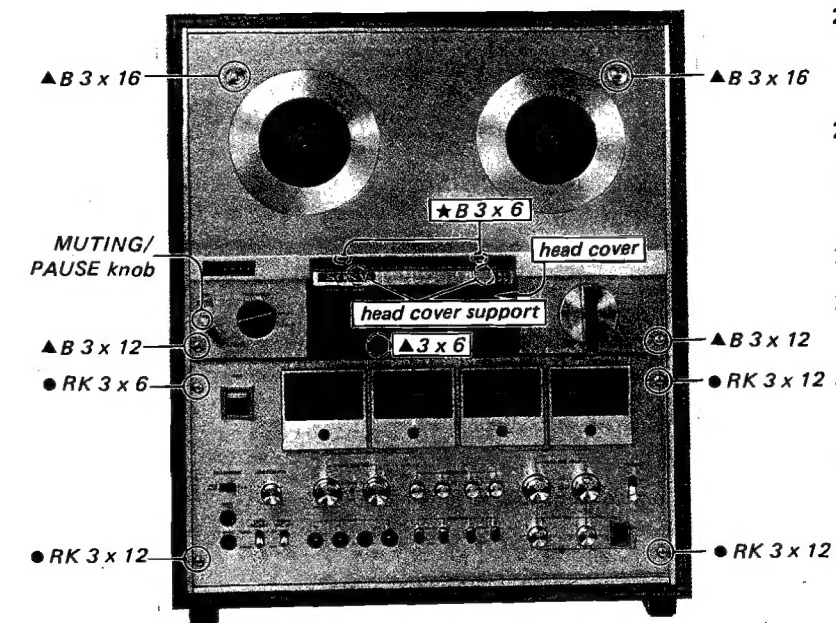
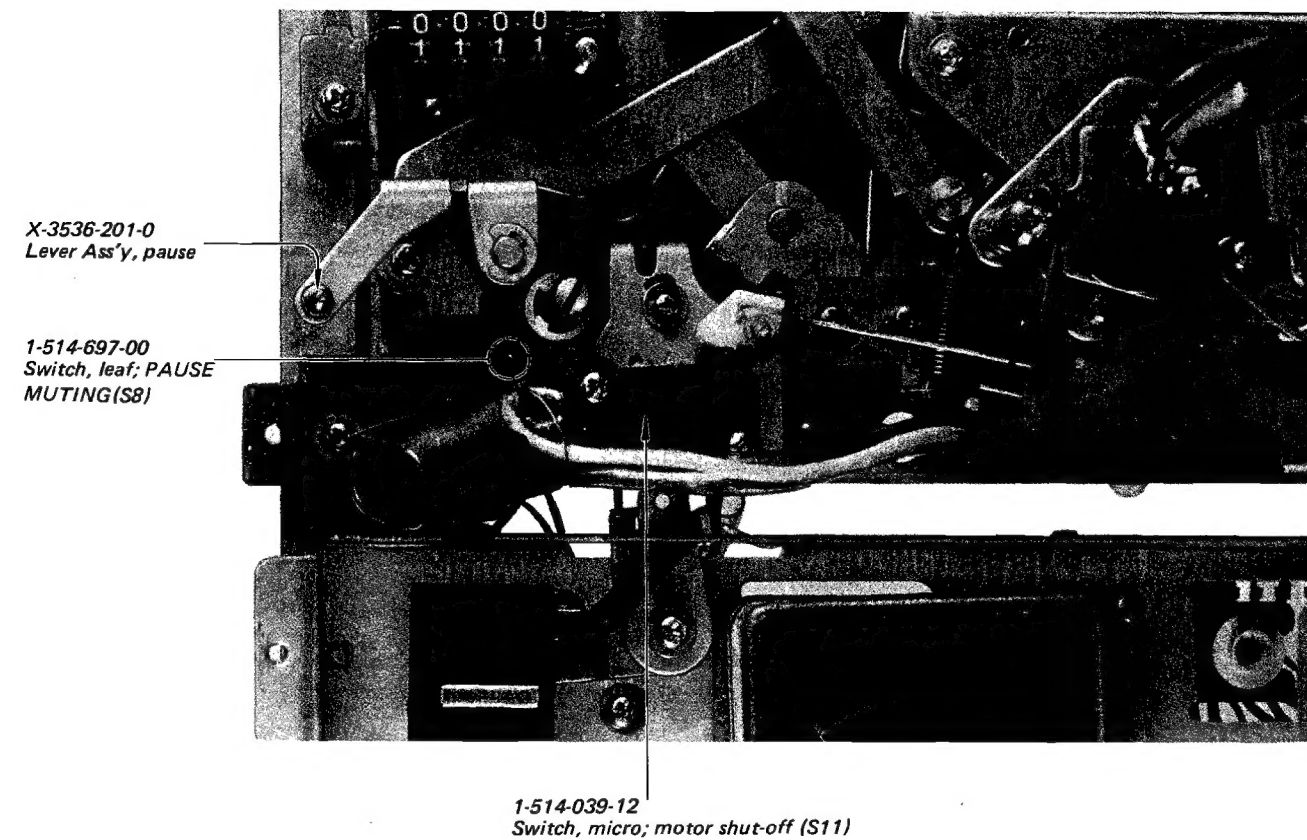


8-825-527-00
Head, erase
EF137-2904H

8-824-729-40
Head, record
RP138-2904

8-829-342-40
Head, playback
PP138-4204

SECTION 2 DISASSEMBLY



2-1. AMP PANEL REMOVAL

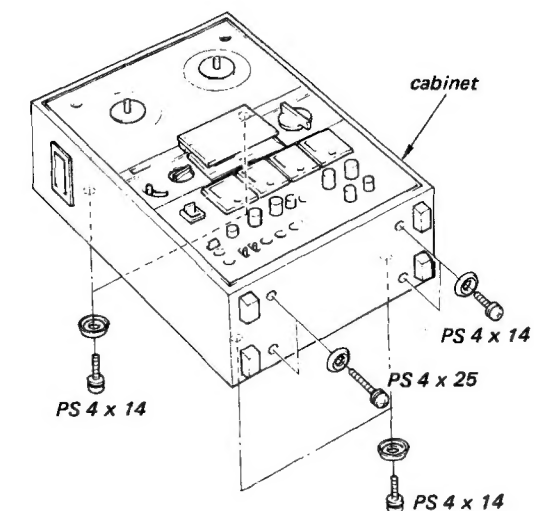
Remove four screws indicated by ●.

2-2. REEL PANEL REMOVAL

- 1) Remove two screws indicated by ★ and remove head cover.
- 2) Remove two head cover supports.
- 3) Remove MUTING/PAUSE knob by turning it counterclockwise.
- 4) Remove five screws indicated by ▲.

2-3. CABINET REMOVAL

Remove eight screws.

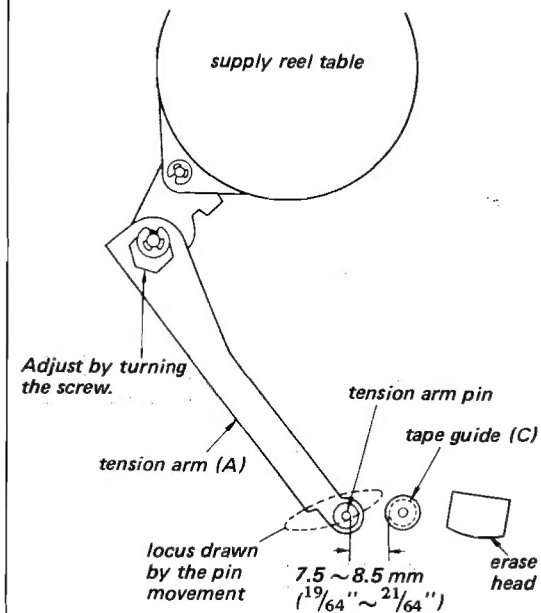


SECTION 3 ADJUSTMENTS

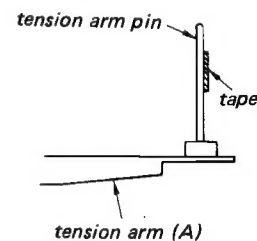
3-1. MECHANICAL ADJUSTMENTS

Tension Arm (A) Adjustment — playback mode —

Perform this adjustment after turning supply reel table counterclockwise by hand.



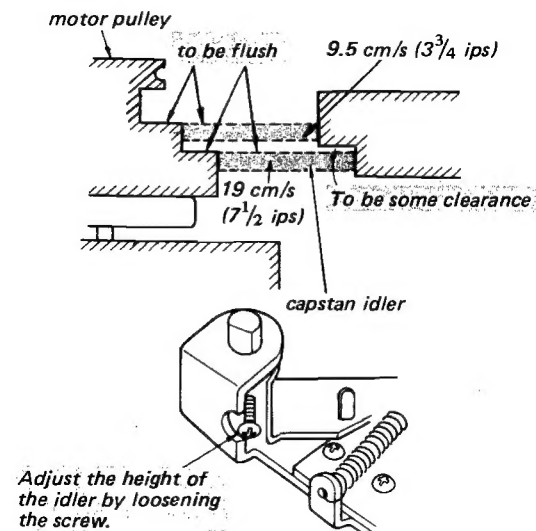
Note: Ensure that the tape uniformly comes in contact with the tension arm pin at the beginning and end of the tape. (If necessary, adjust by bending tension arm pin.)



Capstan Idler Adjustment

Perform this adjustment after motor pulley height check (See Page 12).

— playback mode —

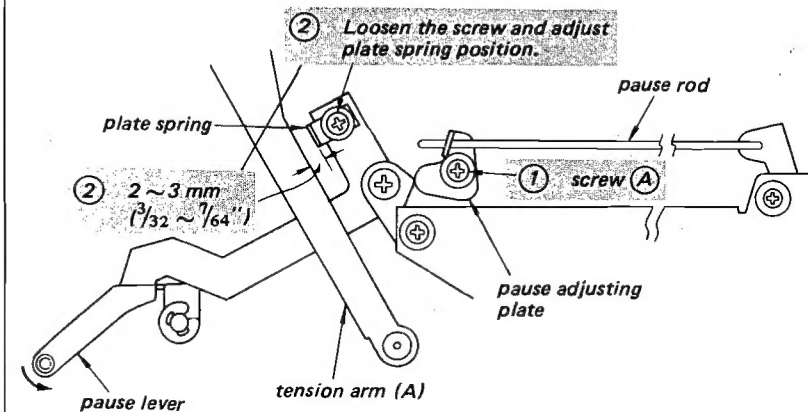


Adjust the height of the idler by loosening the screw.

- Note:**
1. Perform this adjustment for both vertical and horizontal positions.
 2. After the adjustment, apply locking compound to the screw.
 3. Make sure that capstan idler does not contact motor pulley and flywheel in stop mode.

Pause Mechanism Adjustment — playback mode —

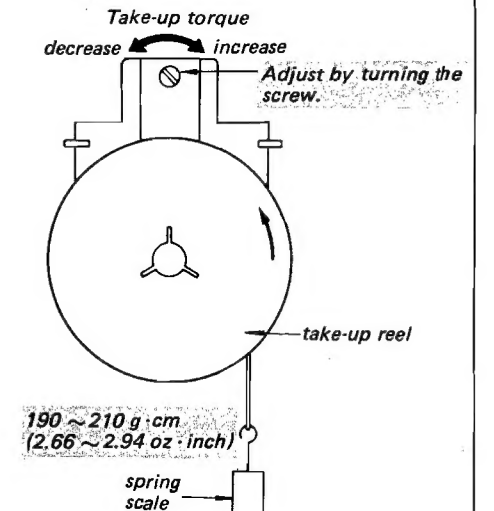
- ① With pause lever pulled, adjust pause adjusting plate position by loosening screw (A) so that clearance between pinch roller and capstan is 0.5 ~ 1 mm (1/32 ~ 1/16 inch).



- Note:**
1. When pulling pause lever in stop mode, ensure that pause lever is not locked.
 2. When pulling pause lever in playback mode, ensure that brake operates.

Take-up Torque Adjustment

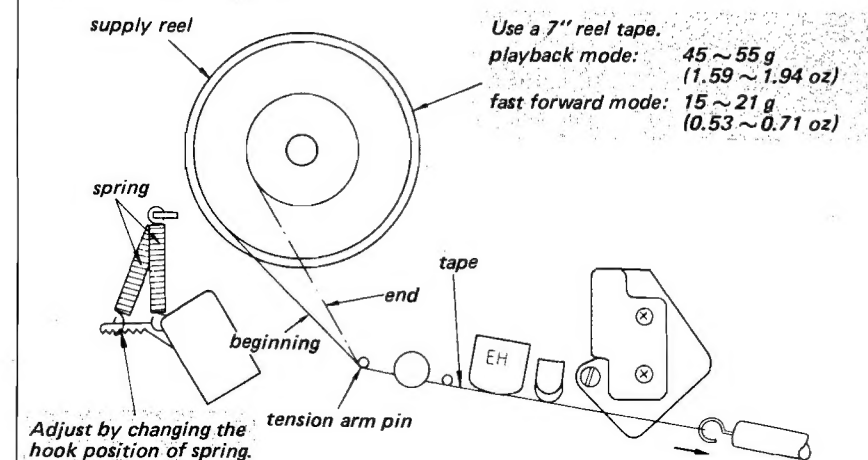
— playback mode at 9.5 cm/s (3 3/4 ips) tape speed —



Note: After the adjustment, apply locking compound to the screw.

Tension Arm (A) Back-tension Adjustment

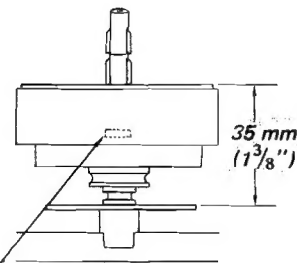
Perform this adjustment after tension arm (A) adjustment (See Page 9).



Note: If the specified back tension is not obtained by the spring hook positioning, perform tension arm (A) adjustment (See Page 9).

Reel Table Height Adjustment

— playback, rewind and fast forward mode —



Adjust by changing the washer so that the tape does not come in contact with the flange of the reel.

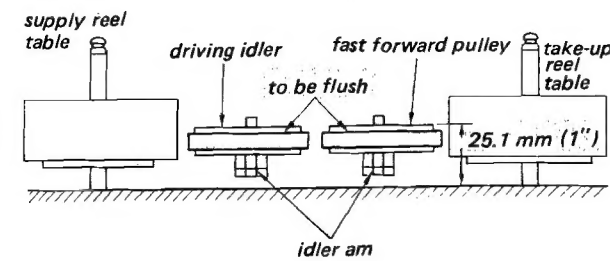
Washer

Part No.	Thickness (mm)
3-701-443-01	0.13
3-701-443-11	0.25
3-701-443-21	0.50

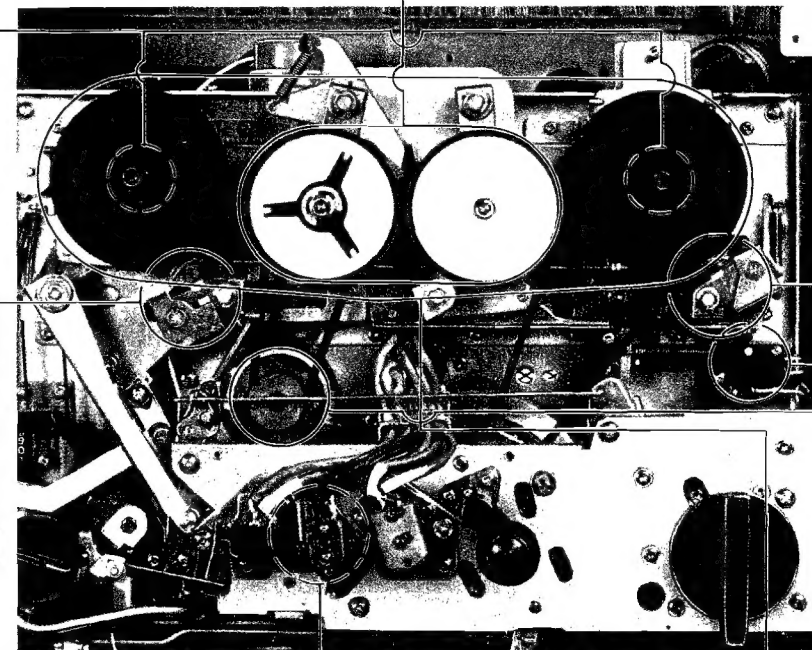
Note: After the adjustment, perform back tension and take-up torque adjustments. (See Page 10).

Fast Forward Pulley and Driving Idler Adjustment

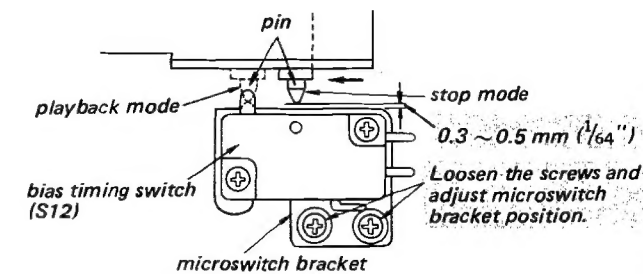
— stop mode —



If necessary, adjust by bending idler arm.



Bias Timing Switch (S12) Position Adjustment



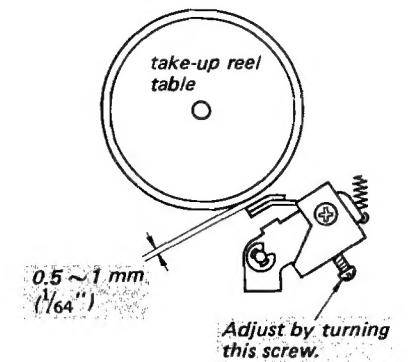
Note: Ensure the following:

1. Bias timing switch is actuated in playback mode.
2. When changing the mode from record to stop slowly, REC button is released after the bias timing switch is released.

Brake Adjustment (take-up reel table)

1. Brake Shoe Adjustment

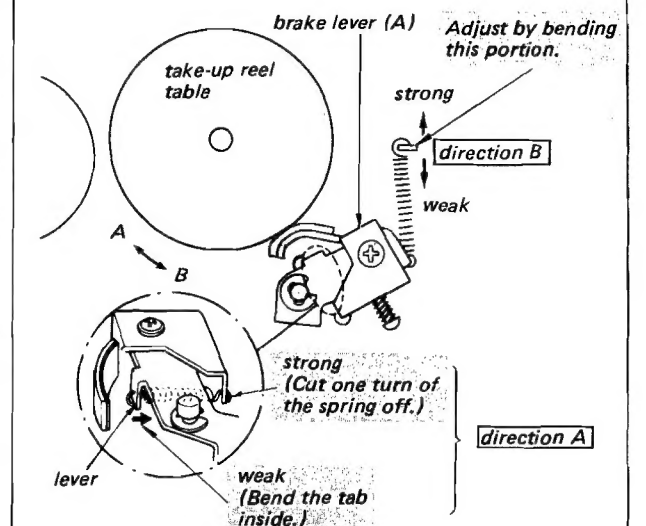
— rewind mode —



2. Brake Torque Adjustment

— stop mode —

take-up reel table braking torque	direction B	350 ~ 450 g · cm (4.9 ~ 6.2 oz · inch)
	direction A	1,300 ~ 1,700 g · cm (18 ~ 24 oz · inch)

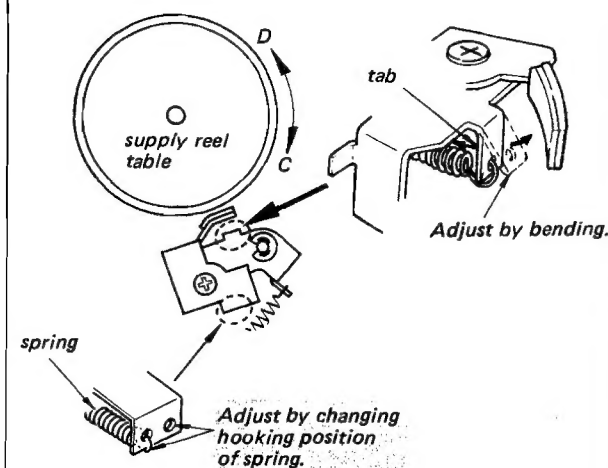


Brake Torque Adjustment (supply reel table)

— stop mode —

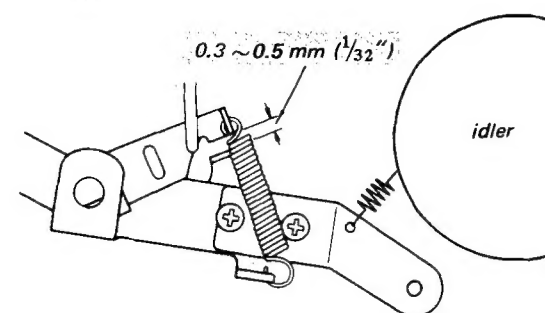
supply reel table braking torque	direction C	150 ~ 250 g · cm (2.1 ~ 3.5 oz · inch)
	direction D	1,300 ~ 1,700 g · cm (18 ~ 24 oz · inch)

Adjustable for direction D only.

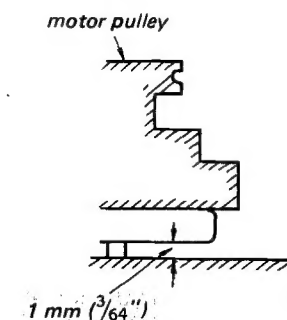


Idler Arm Stroke Check

— playback mode at 9.5 cm/s (3 3/4 ips) tape speed —

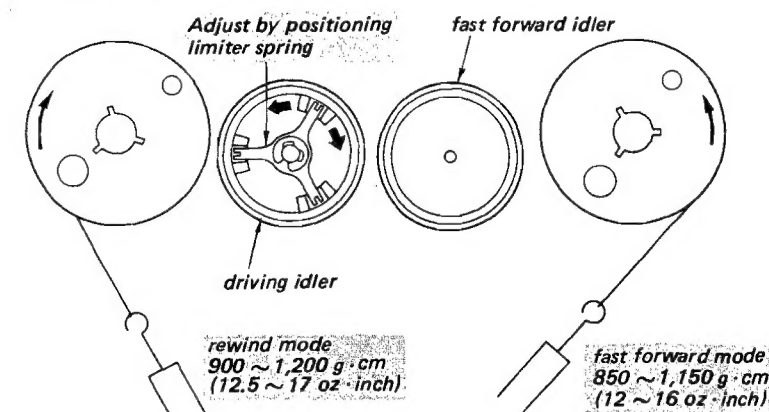


Motor Pulley Height Check



Fast Forward and Rewind Torque Adjustments

— rewind and fast forward mode —

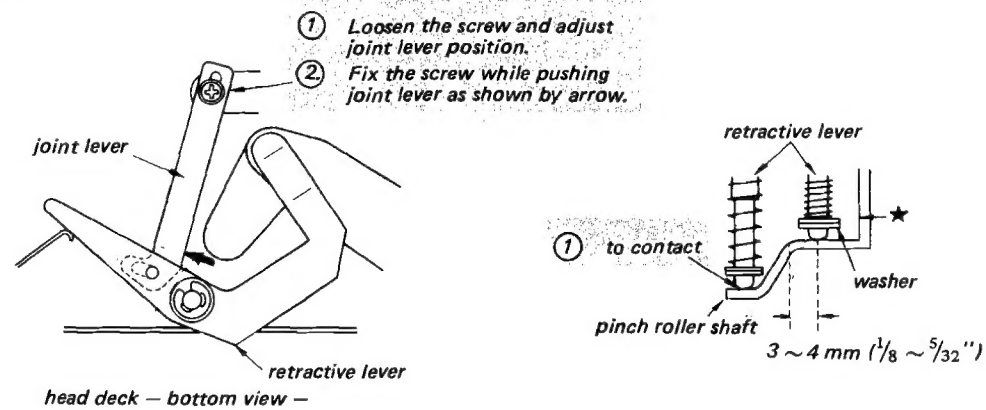


Note: The torque should be measured just when driving idler stops rotating.

Pinch Roller Stroke Adjustment

Remove head deck by removing four screws indicated by ▲ on Page 41.

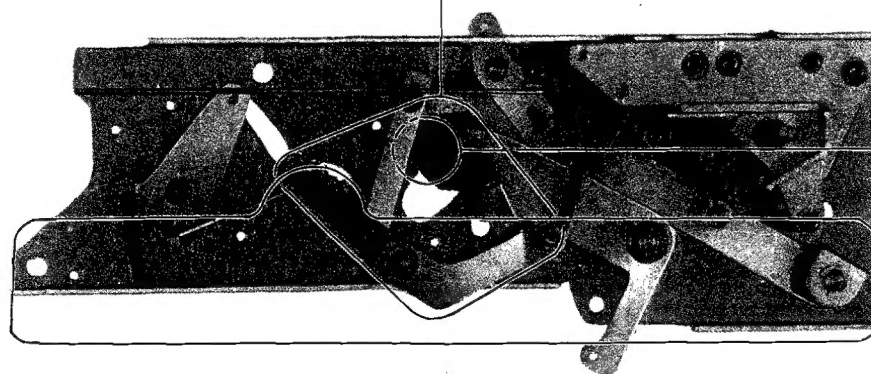
— stop mode —



- Note:** 1. Put dummy capstan ※ into capstan bearing and ensure that pinch roller shaft moves by 3 ~ 4 mm (1/8 ~ 5/32") on the retractive lever when changing the mode from stop to playback.
2. Ensure that washer of pinch roller shaft does not contact the part indicated by ★ when changing the mode from playback to fast forward slowly.
3. Apply locking compound to the screw.

※ Dummy Capstan (capstan shaft)

Prepare a flywheel ass'y (X-3472-003-0) and remove capstan shaft from it by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft.

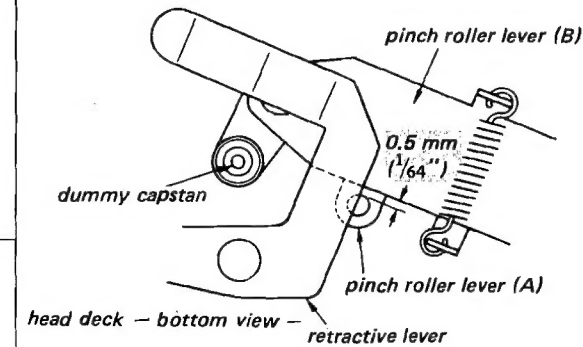


Bottom view of head deck

Pinch Roller Pressure Check

1. Put dummy capstan ※ into capstan bearing and ensure the following.

— playback mode —



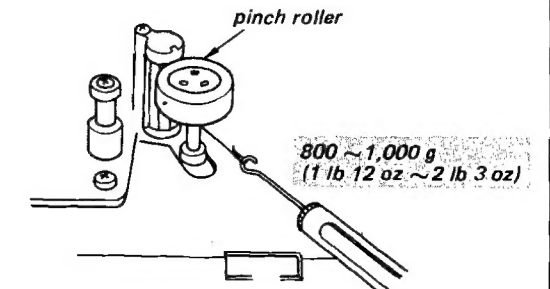
Note: The pressure should be measured just when the pinch roller releases from capstan.

※ Dummy capstan (capstan shaft)

Prepare a flywheel ass'y (X-3472-003-0) and remove capstan shaft from it by patting the head of the capstan shaft with the hammer, taking care not to bend the shaft.

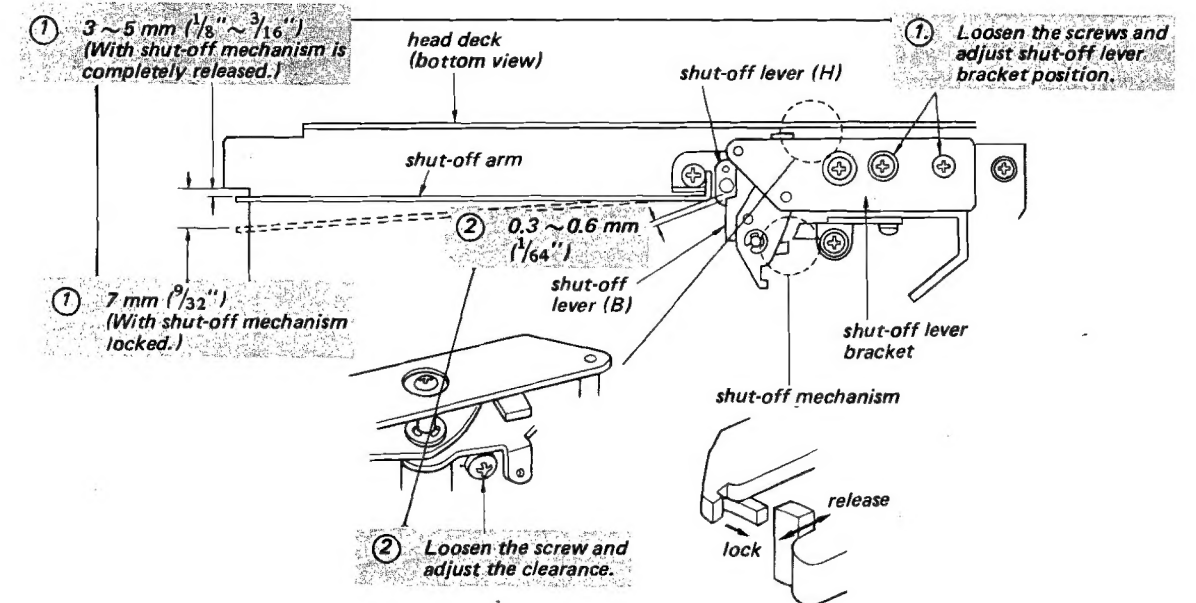
2. Measure the pressure.

— playback mode —



Shut-off Mechanism Adjustment

— stop mode —



Note: After the adjustment, apply locking compound to the screws.

3-2. ELECTRICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with alcohol moistened swab:
 record head
 playback head
 erase head
 capstan
 pinch roller
2. Demagnetize the record head and the playback head with a head demagnetizer. Do not use a magnetized screwdriver for adjustments.
3. The adjustments should be performed in the order arranged in the service manual.
4. The adjustments and the measurements should be performed with rated power supply voltage, unless otherwise specified.
5. After the adjustments, apply locking compound to the adjusted parts.

Test Equipment/Tools Required:

audio oscillator (af osc)
 VTVM
 digital frequency counter
 speed checker (SONY LFM-30)
 attenuator (600 Ω)
 $\frac{1}{4}$ W resistors, 600 Ω , 10 k Ω , 100 k Ω
 blank tape { SONY SLH-S1 (SPECIAL)
 SONY NPS-1 (NORMAL)
 SONY test tapes:
 J-9-F1
 J-19-F2
 SPC-47

Standard Levels:

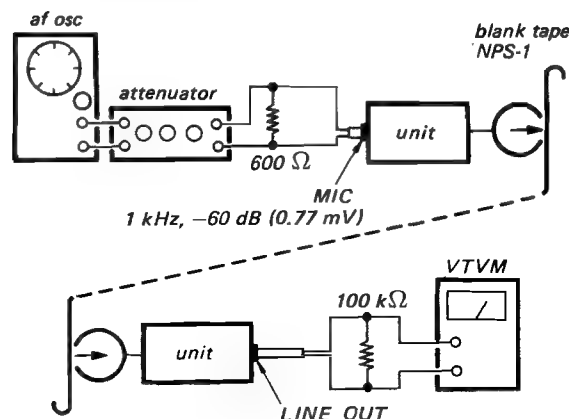
Input	Impedance	Signal level
MIC	600 Ω	-60 dB (0.77 mV)
LINE IN	10 k Ω	-10 dB (0.25 V)
Output	Load Impedance	Signal level
LINE OUT	100 k Ω	0 dB (0.775 V)

Normal REC VOL Control Position:

REC VOL (MIC)

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 REC VOL (LINE): MIN
 FRONT MIC ATT switch: 0 dB
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE

Mode: record and simultaneous playback

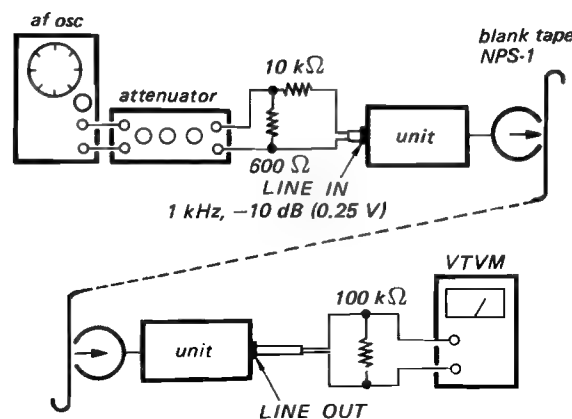


Turn REC VOL (MIC) control for 0 dB (0.775 V) VTVM reading.

REC VOL (LINE)

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 REC VOL (MIC): MIN
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE

Mode: record and simultaneous playback



Turn REC VOL (LINE) control for 0 dB (0.775 V) VTVM reading.

1. Tape Path Adjustment and Head Height Rough Adjustment

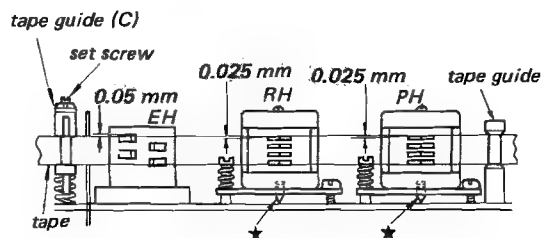
Procedure:

A) Tape Path Adjustment

1. Loosen the set screw.
2. Adjust tape guide (C) so that upper edge of the tape is aligned on upper edge of the erase head core.
3. Turn tape guide (C) 35° clockwise.
4. Fix the set screw.

B) Head Rough Height Adjustments

1. Adjust the screws indicated by ★ by turning alternately in the same direction so that upper edges of the erase, record and the playback heads are aligned on the upper edge of the tape.
2. Turn the screws indicated by ★ 15° clockwise.



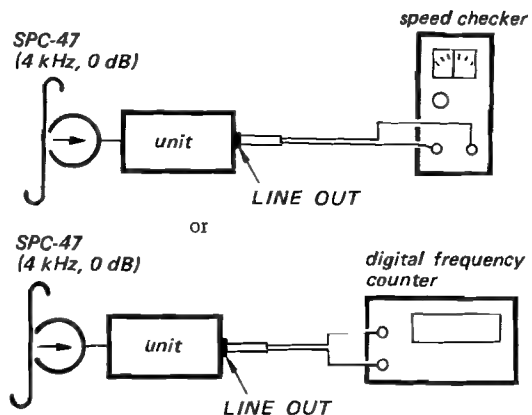
2. Tape Speed Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

Procedure:

Mode: playback

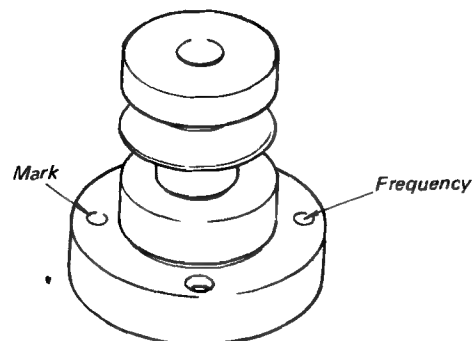


Specification:

speed checker	digital frequency counter
-1.5 ~ +1.5 %	3940 ~ 4060

If necessary, replace motor pulley.

Motor Pulley



Part No.	Mark	Speed
3-518-068-61	+2	faster
3-518-068-51	+1	
3-518-068-41	+0.5	
3-518-068-01	0	
3-518-068-11	-0.5	
3-518-068-21	-1	
3-518-068-31	-2	slower

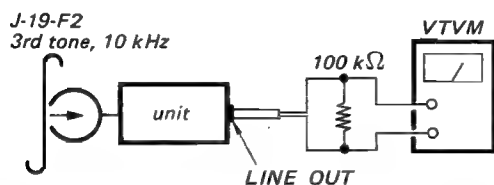
3. Playback Head Azimuth Adjustment

Settings:

TAPE SPEED switch:	19 cm/s
TAPE SELECT switch:	NORMAL
LINE OUT VOL control:	MAX
MONITOR switch:	TAPE
PAN POT switch:	OFF
REC MODE buttons:	released

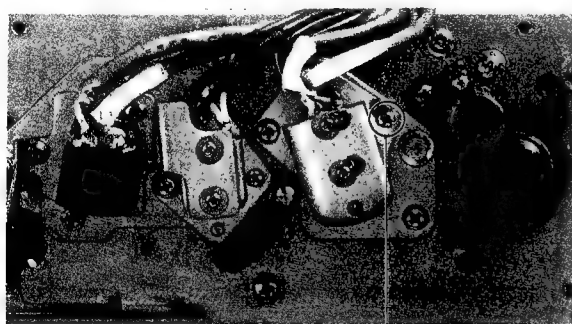
Procedure:

Mode: playback



Adjust the azimuth adjusting screw for the highest VTVM reading.

Adjustment Location:



azimuth adjusting screw

- Note:**
1. Several peaks may appear, take the highest.
 2. If the highest peak readings for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screws. At that time, ensure that the difference between the maximum and the minimum readings is not more than 1 dB on the VTVM.
 3. If you turn the azimuth adjusting screw more than one turn, perform tape path adjustment (See Page 16).
 4. When touching the supply reel table lightly, ensure that VTVM reading is not increased more than 1 dB.

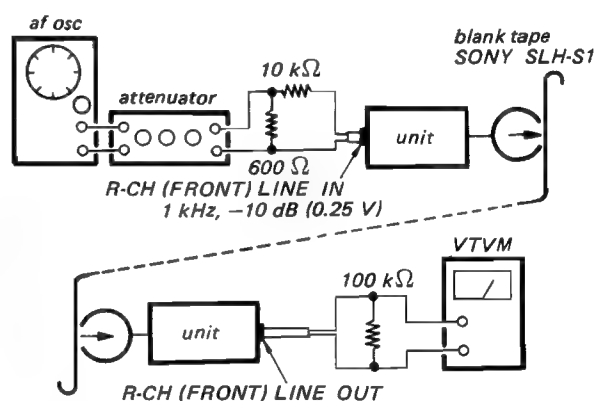
4. Record Head Height Adjustment

Settings:

TAPE SPEED switch:	19 cm/s
TAPE SELECT switch:	SPECIAL
LINE OUT VOL control:	MAX
PAN POT switch:	OFF
REC MODE buttons:	pressed
MONITOR switch:	TAPE
REC VOL (LINE) control:	normal position (See Page 15.)

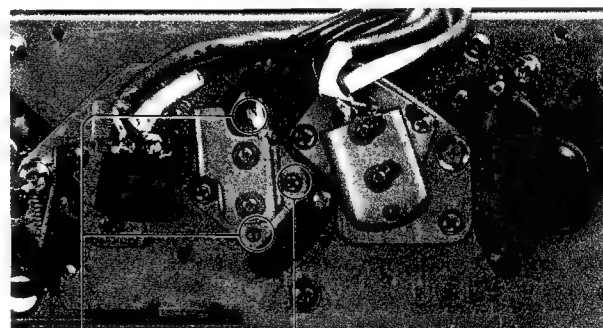
Procedure:

Mode: record and simultaneous playback



Adjust the three screws for the maximum R-CH (FRONT) VTVM reading.

Adjustment Location:



zenith and
height adjusting
screws

azimuth
adjusting
screw

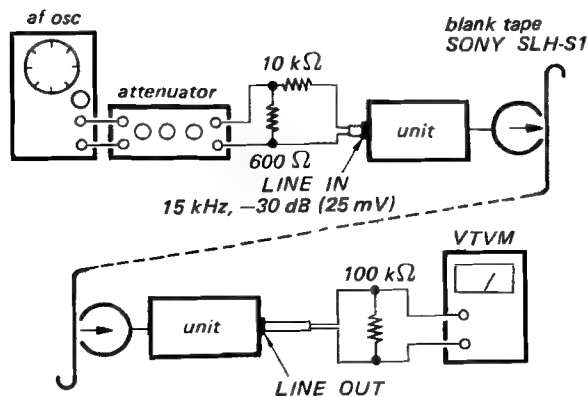
5. Record Head Azimuth Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed
 MONITOR switch: TAPE
 REC VOL (LINE) control: normal position
 (See Page 15.)

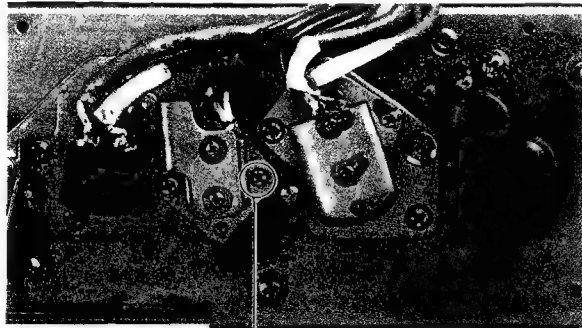
Procedure:

Mode: record and simultaneous playback



Adjust the azimuth adjusting screw for the highest VTVM reading.

Adjustment Location:



azimuth adjusting screw

- Note:** 1. If the highest peak reading for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screws and the difference between each extreme peak level and the adjusted output level should be within 1 dB difference. If the difference is more than 1 dB, change the record head.
2. If you turn the azimuth adjusting screw more than one turn, perform record head height adjustment (See Page 17).

6. Phasing Adjustment

Settings:

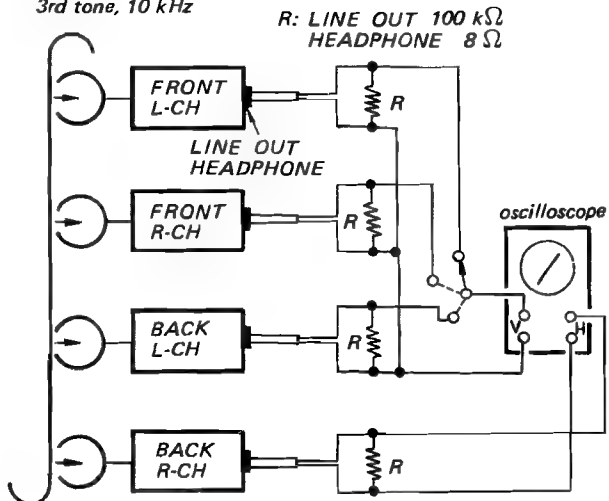
TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

Procedure:

Mode: playback

J-19-F2

1st tone, 400 Hz
 3rd tone, 10 kHz



Check the following:

J-19-F2	On the oscilloscope
2nd tone (400 Hz)	 in phase
3rd tone (10 kHz)	 in phase $\pm 90^\circ$

If necessary, finely adjust the playback head azimuth adjusting screw. (See Page 17.)

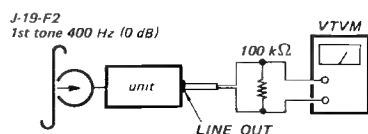
7. Playback Output Level Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

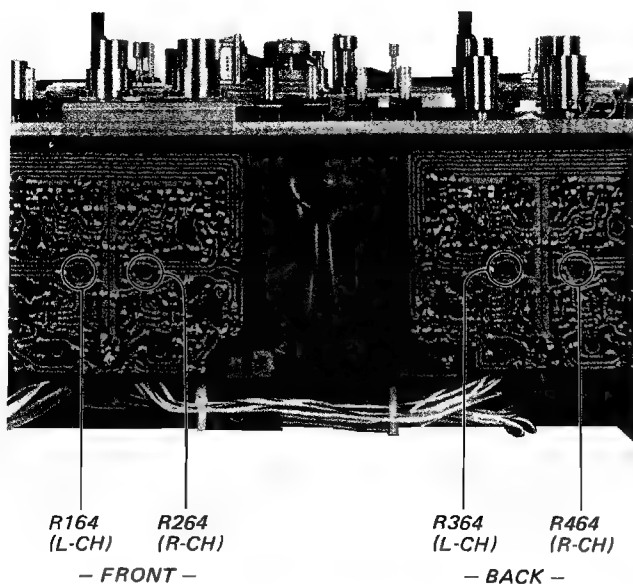
Procedure:

Mode: playback



Adjust R164, 264, 364, 464 for 0 dB (0.775 V) VTVM reading.

Adjustment Location:



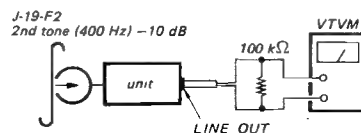
8. Playback Equalizer Adjustment

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: released

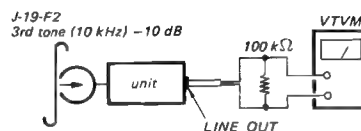
Procedure:

1. Mode: playback [TAPE SPEED switch: 19 cm/s (7½ ips)]



Make sure that VTVM reading is -10 dB (0.25 V).

2. Mode: playback



Adjust the resistors R157, 257, 357, 457 for -10.5 dB (0.23 V) VTVM reading.

3. Play back test tape J-19-F2 and ensure that each tone output level deviation against 2nd tone is as follows.

J-19-F2	Tone	3	4	5	6	7
	Frequency (Hz)	10 kHz	12.5 k	7 k	80	40
	Level Deviation from 2nd tone (400 Hz)	-0.5 ± 1 dB	-0.5 ± 2 dB	-0.5 ± 1.5 dB	-2 ± 1.5 dB	+2 ± 2 dB

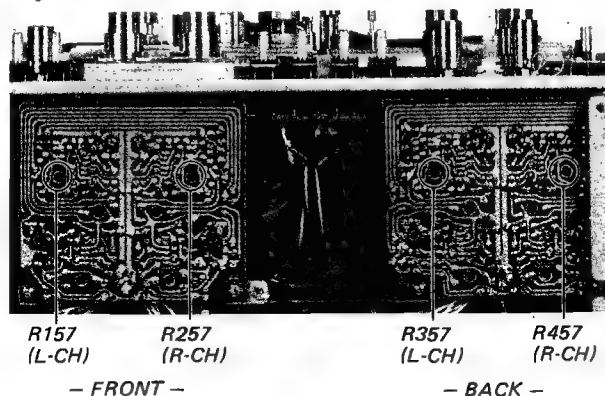
4. Play back test tape J-9-F1 and ensure that each tone output level deviation against 3rd tone is as follows.

[TAPE SPEED switch: 9.5 cm/s (3¾ ips)]

J-9-F1	Tone	4	5	6	7
	Frequency (Hz)	5 k	3 k	200	80
	Level Deviation from 3rd tone (400 Hz)	1 ± 2 dB	-1 ± 1.5 dB	+0.5 ± 1.5 dB	+1.5 ± 2 dB

Note: When this adjustment changes the playback level, readjust the playback level.

Adjustment Location:



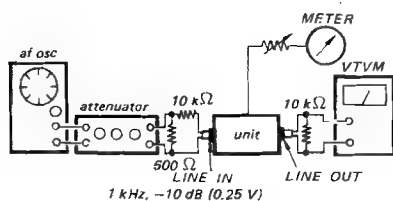
9. Level Meter Calibration

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (LINE): normal position
 (See Page 15.)

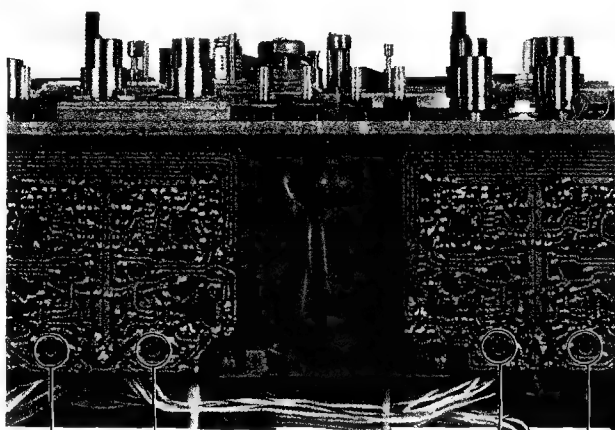
Procedure:

Mode: record



Adjust the resistors R174, 274, 374, 474 so that the pointer of level meter is at 0 VU on the scale.

Adjustment Location:



R174 R274
(L-CH) (R-CH)
- FRONT -

R374 R474
(L-CH) (R-CH)
- BACK -

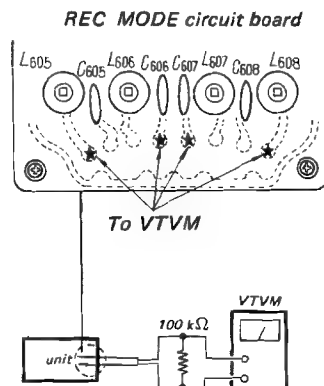
10. Trap Coil Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (MIC): MIN
 REC VOL (LINE): MIN

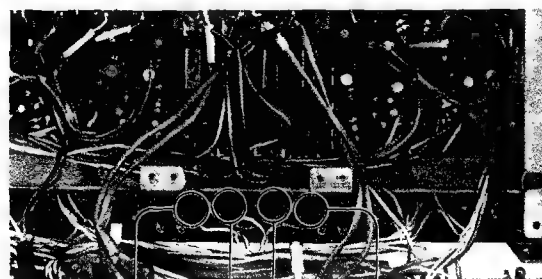
Procedure:

Mode: record



Adjust the trap coils L605, 606, 607, 608 for minimum VTVM reading.

Adjustment Location:



L605 L606 L607 L608
(L-CH) (R-CH) (L-CH) (R-CH)
- FRONT - - BACK -

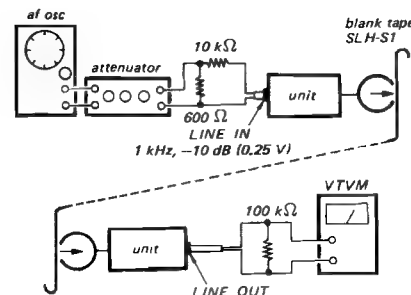
11. Record Bias Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
TAPE SELECT switch: SPECIAL
LINE OUT VOL control: MAX
MONITOR switch: TAPE
PAN POT switch: OFF
REC MODE buttons: pressed
REC VOL (LINE): normal position
(See Page 15.)

Procedure:

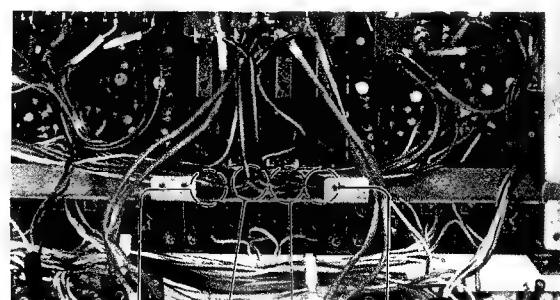
1. Mode: record and simultaneous playback



Adjust the trimmer capacitors C609, 610, 611, 612 for maximum VTVM reading.

2. Turn the trimmer capacitor clockwise for 0.5 dB below the maximum reading.

Adjustment Location:



C609 C610 C611 C612
(L-CH) (R-CH) (L-CH) (R-CH)
- FRONT - - BACK -

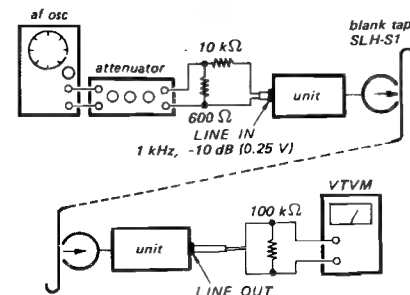
12. Record Level Adjustment

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
TAPE SELECT switch: SPECIAL and NORMAL
LINE OUT VOL control: MAX
MONITOR switch: TAPE
PAN POT switch: OFF
REC MODE buttons: pressed
REC VOL (LINE): normal position
(See Page 15.)

Procedure:

1. Mode: record and simultaneous playback
[TAPE SPEED switch: 19 cm/s (7½ ips)]

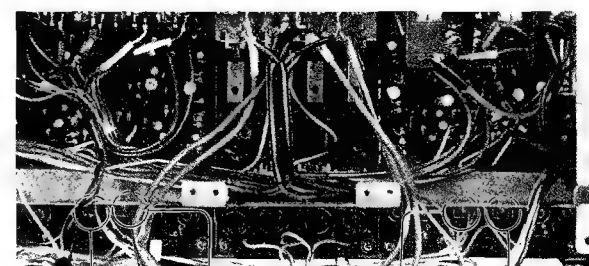


Adjust the resistors R123, 223, 323, 423 for 0 dB (0.775 V) VTVM reading.

TAPE SPEED	TAPE	
	SPECIAL	NORMAL
19 cm/s (7½ ips)	0 dB ± 1 dB (0.69 ~ 0.87 V)	* 0 dB ± 1 dB (0.69 ~ 0.87 V)
9.5 cm/s (3¾ ips)	* 0 dB ± 2 dB (0.62 ~ 0.97 V)	* 0 dB ± 2 dB (0.62 ~ 0.97 V)

* check only

Adjustment Location:



R123 R223 R323 R423
(L-CH) (R-CH) (L-CH) (R-CH)
- FRONT - - BACK -

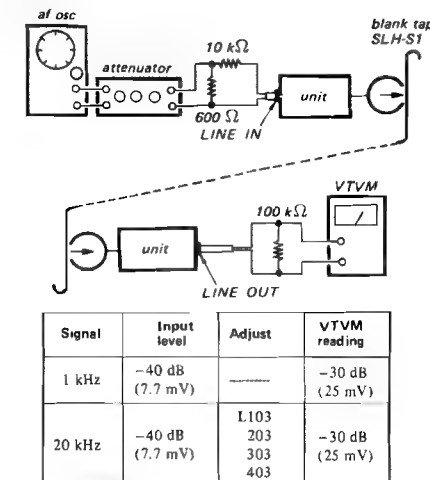
13. Record Equalizer Adjustment (SPECIAL)

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
TAPE SELECT switch: SPECIAL
LINE OUT VOL control: MAX
MONITOR switch: TAPE
PAN POT switch: OFF
REC MODE buttons: pressed
REC VOL (LINE): normal position
(See Page 15.)

Procedure:

1. Mode: record and simultaneous playback



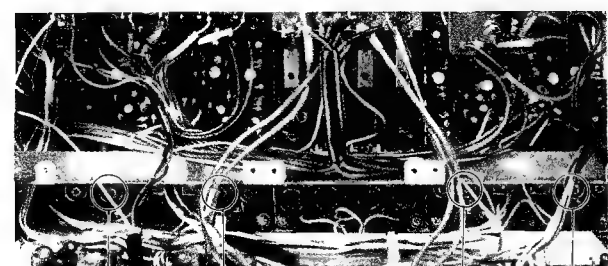
Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	-----	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L103 203 303 403	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7½ ips)	9.5 cm/s (3¾ ips)
30 Hz	± 3 dB	± 3 dB
200 Hz	± 3 dB	± 3 dB
6 kHz	± 3 dB	± 3 dB
10 kHz	± 3 dB	± 3 dB
15 kHz	± 3 dB	± 3 dB
20 kHz	-----	± 3 dB
23 kHz	± 3 dB	-----

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:



L103 L203 L303 L403
(L-CH) (R-CH) (L-CH) (R-CH)
- FRONT - - BACK -

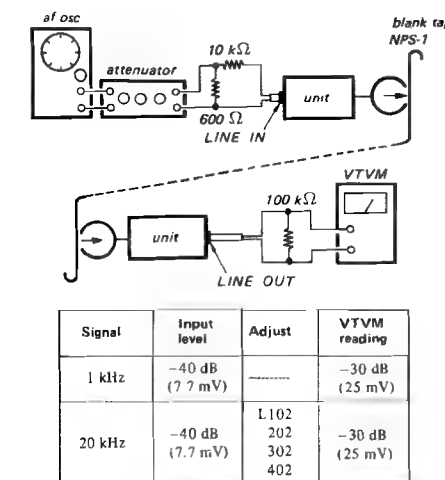
14. Record Equalizer Adjustment (NORMAL)

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
TAPE SELECT switch: NORMAL
LINE OUT VOL control: MAX
MONITOR switch: TAPE
PAN POT switch: OFF
REC MODE buttons: pressed
REC VOL (LINE): normal position
(See Page 15.)

Procedure:

1. Mode: record and simultaneous playback



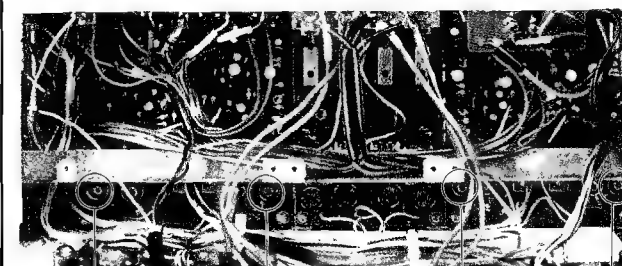
Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	-----	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L102 202 302 402	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7½ ips)	9.5 cm/s (3¾ ips)
30 Hz	± 3 dB	± 3 dB
200 Hz	± 3 dB	± 3 dB
6 kHz	± 3 dB	± 3 dB
10 kHz	± 3 dB	± 3 dB
15 kHz	± 3 dB	± 3 dB
20 kHz	-----	± 3 dB
23 kHz	± 3 dB	-----

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:



L102 L202 L302 L402
(L-CH) (R-CH) (L-CH) (R-CH)
- FRONT - - BACK -

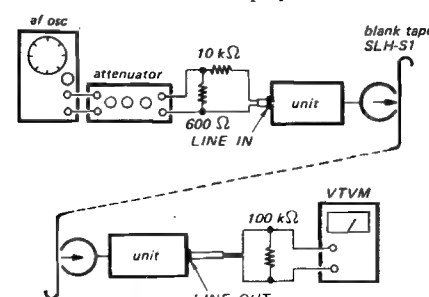
13. Record Equalizer Adjustment (SPECIAL)

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (LINE): normal position
 (See Page 15.)

Procedure:

1. Mode: record and simultaneous playback



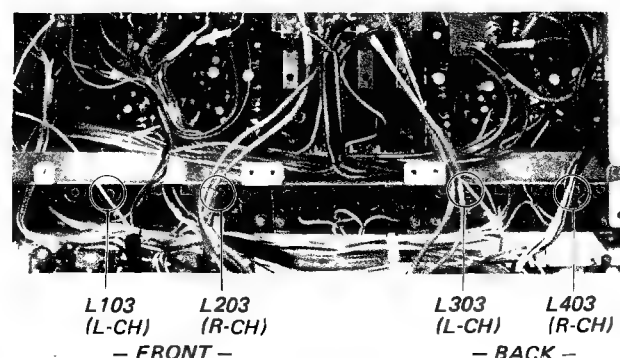
Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	---	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L103 203 303 403	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7% ips)	9.5 cm/s (3% ips)
30 Hz	± 3 dB	± 3 dB
200 Hz	± 3 dB	± 3 dB
6 kHz	± 3 dB	± 3 dB
10 kHz	± 3 dB	± 3 dB
15 kHz	± 3 dB	± 3 dB
20 kHz	± 3 dB	± 3 dB
23 kHz	± 3 dB	---

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:



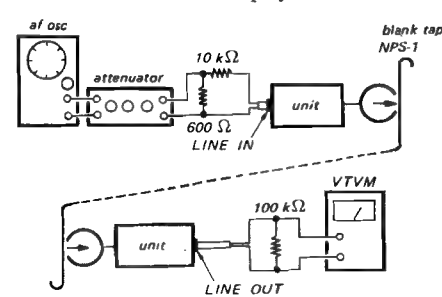
14. Record Equalizer Adjustment (NORMAL)

Settings:

TAPE SPEED switch: 19 cm/s and 9.5 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: pressed
 REC VOL (LINE): normal position
 (See Page 15.)

Procedure:

1. Mode: record and simultaneous playback



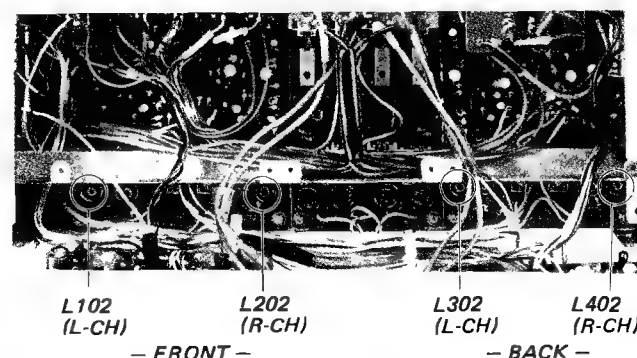
Signal	Input level	Adjust	VTVM reading
1 kHz	-40 dB (7.7 mV)	---	-30 dB (25 mV)
20 kHz	-40 dB (7.7 mV)	L102 202 302 402	-30 dB (25 mV)

2. Check the frequency response:

Signal (input level -40 dB, 7.7 mV)	Output Level Deviation from 1 kHz signal	
	19 cm/s (7% ips)	9.5 cm/s (3% ips)
30 Hz	± 3 dB	± 3 dB
200 Hz	± 3 dB	± 3 dB
6 kHz	± 3 dB	± 3 dB
10 kHz	± 3 dB	± 3 dB
15 kHz	± 3 dB	± 3 dB
20 kHz	± 3 dB	± 3 dB
23 kHz	± 3 dB	---

Note: If necessary, readjust the record bias adjustment (See Page 21).

Adjustment Location:



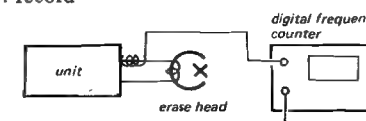
15. Dummy Coil Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: SPECIAL
 LINE OUT VOL control: MAX
 MONITOR switch: TAPE
 PAN POT switch: OFF
 REC MODE buttons: pressed

Procedure:

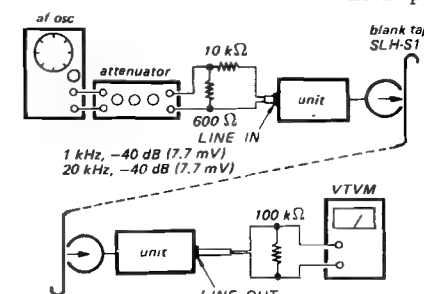
1. Mode: record



Memorize the counter reading.

Release REC MODE buttons of the following channels.	Adjust the coils so that the frequency is the same as step 1
FRONT L-CH	L601
FRONT R-CH	L602
BACK L-CH	L603
BACK R-CH	L604

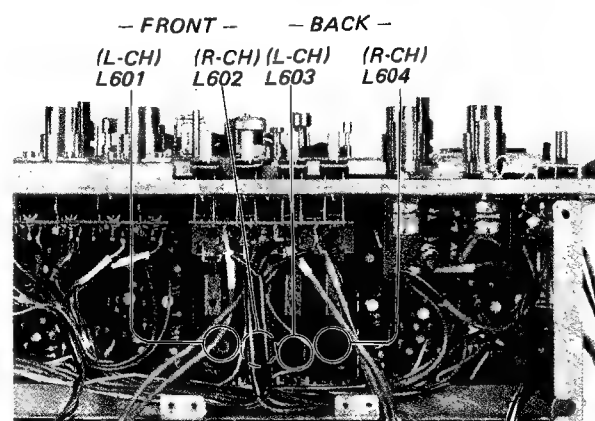
2. (1) Mode: 4-channel record and simultaneous playback
 (2) Mode: 2-channel record and simultaneous playback
 (3) Mode: 1-channel record and simultaneous playback



Make sure of the following:

Record and simultaneous playback	Output level
4-channel	0 dB (0.775 V)
2-channel	0 ± 2 dB (0.62 ~ 0.97 V)
1-channel	0 ± 2 dB (0.62 ~ 0.97 V)

Adjustment Location:



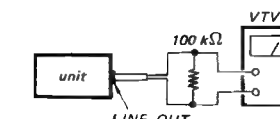
16. Trap Coil (Bias Leakage) Adjustment

Settings:

TAPE SPEED switch: 19 cm/s
 TAPE SELECT switch: NORMAL
 LINE OUT VOL control: MAX
 PAN POT switch: OFF
 REC MODE buttons: pressed (FRONT buttons or BACK buttons)
 REC VOL (LINE): normal position (See Page 15.)
 MONITOR switch: SOURCE

Procedure:

1. (1) Mode: 2-channel record (FRONT L-, R-CH)
 (2) Mode: 2-channel record (BACK L-, R-CH)

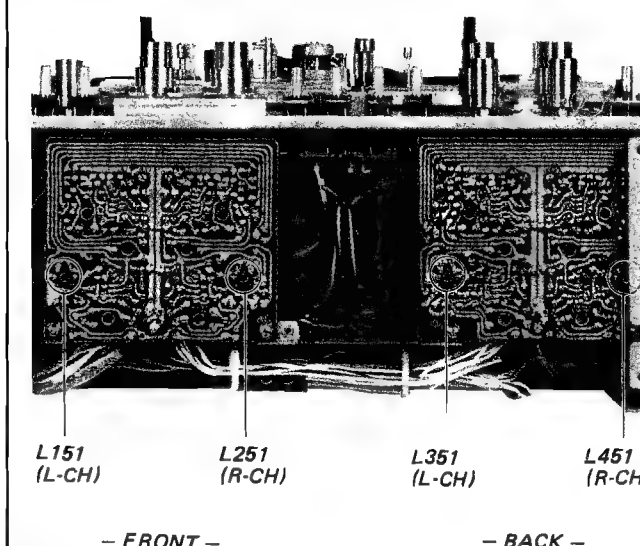


Record	Adjust	VTVM reading
FRONT L-, R-CH	L151, 251	minimum
BACK L-, R-CH	L351, 451	

2. Make sure of the following:

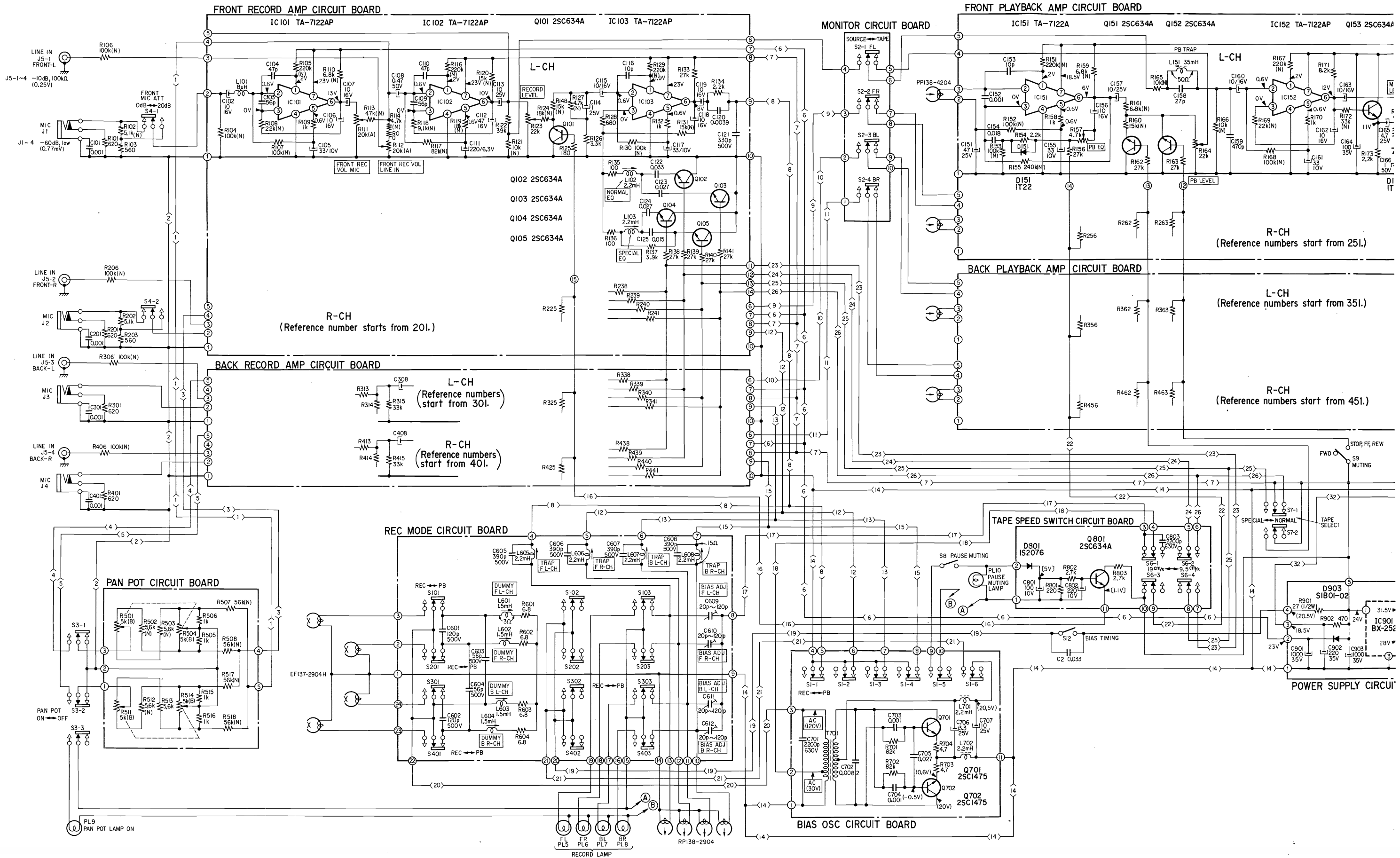
Record	VTVM reading
4-channel	Less than -40 dB (7.7 mV)
2-channel	
1-channel	

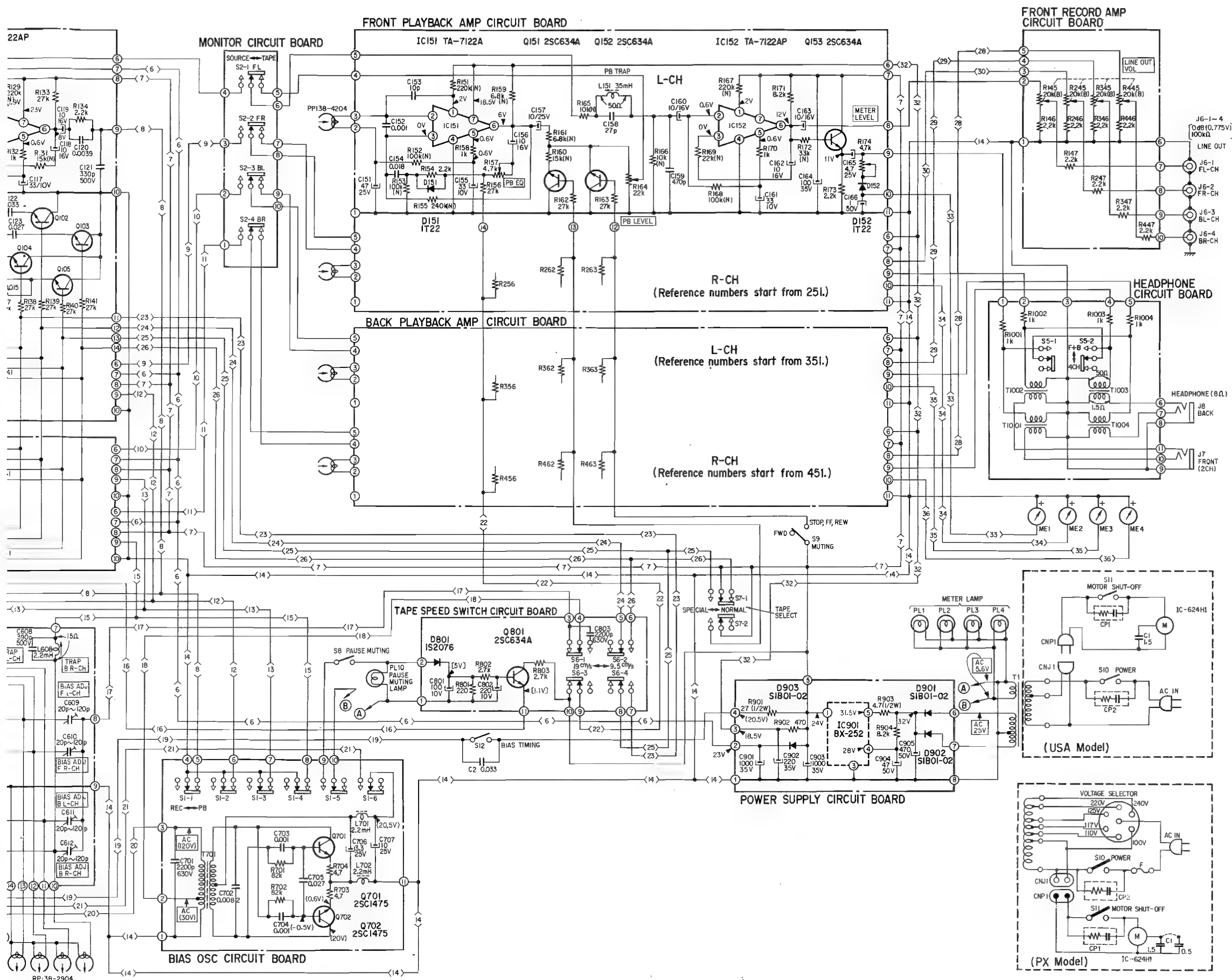
Adjustment Location:



4-1. SCHEMATIC DIAGRAM

DIAGRAMS





Note:

- All resistors and capacitors are in Ω and μF unless otherwise specified.
- Letter in () suffixed to variable resistor value indicates characteristics.
- --- : Chassis ground
- Values for transformer windings are DC resistance.
- (N) : Low noise resistor
- Voltage values shown are measured with a VOM (DC 20 k Ω/V , AC 8 k Ω/V) and VTVM. Variations may be noted due to normal production tolerances.
no mark: playback mode voltage (VOM)
() : record mode voltage (VTVM)
[] : pause mode voltage (VTVM)

• Switch mode:

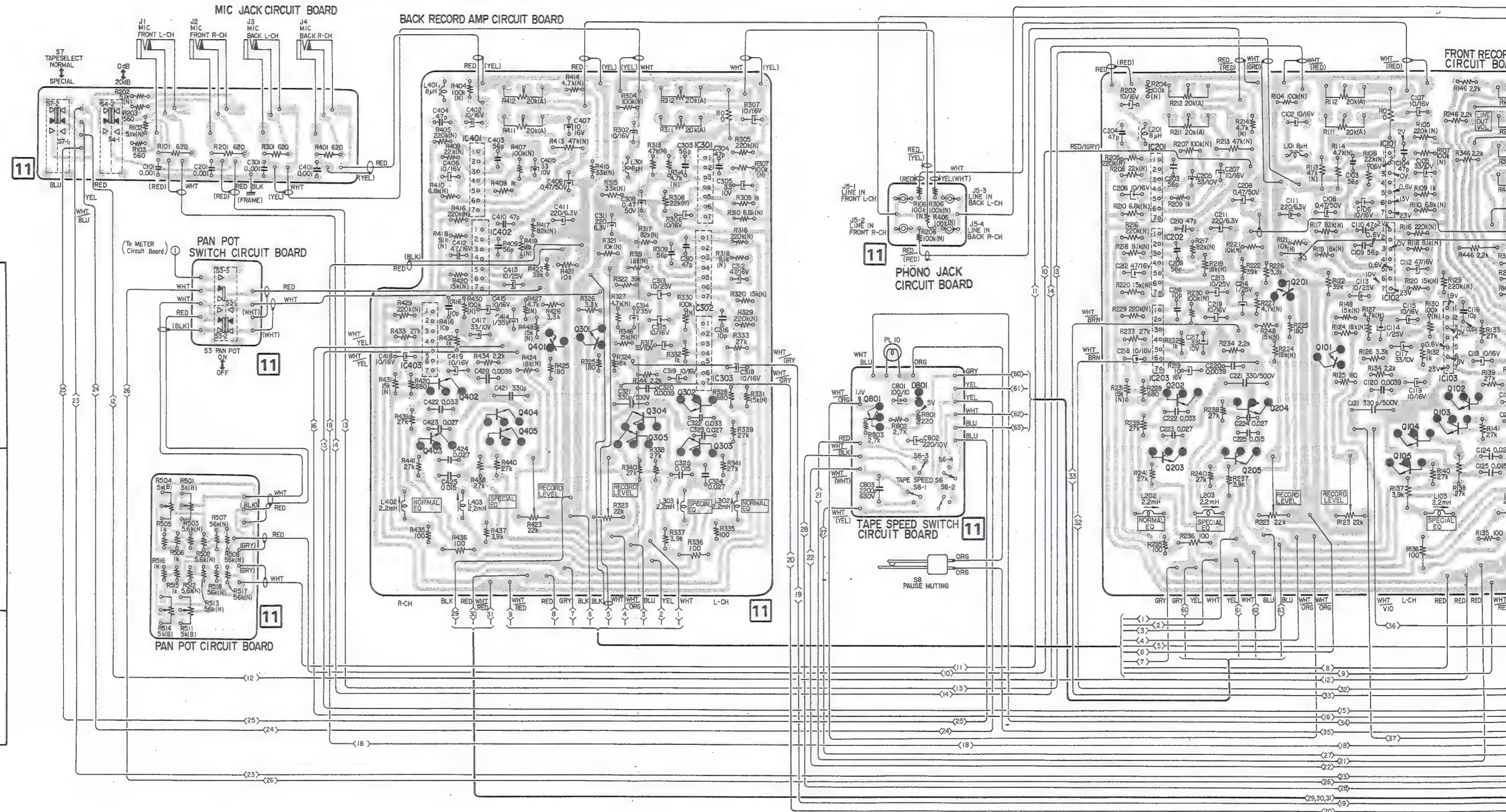
Ref. No.	Switch	Mode
S1	record/playback	playback
S2	MONITOR	TAPE
S3	PAN POT	OFF
S4	FRONT MIC ATT	0 dB
S5	HEADPHONE	4 CH
S6	TAPE SPEED	19 cm/sec
S7	TAPE SELECT	NORMAL
S8	PAUSE MUTING	OFF
S9	MUTING	OFF
S10	POWER	OFF
S11	motor shut-off	OFF
S12	bias timing	OFF
S101, 201, 203	REC MODE	playback
S301, 401, 303	REC MODE	playback
S102, 103, 202	REC MODE	playback
S303, 402, 403	REC MODE	playback

4.2. MOUNTING DIAGRAMS

— Conductor Side —

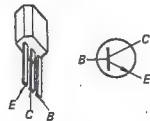
Q	Q402	Q404	Q401	Q301	Q304	Q302
D	Q403	Q405		Q303	Q305	Q303
ADJ	L402	L403	R423	R323	L303	L302

Q	Q202	Q204	Q201	Q101	Q104	Q102
D	Q203	Q205			Q105	Q103
ADJ	R212	R223		R123		R145



Q101, 201, 301, 401
Q102, 202, 302, 402
Q103, 203, 303, 403
Q104, 204, 304, 404
Q105, 205, 305, 405
Q801

: 2SC634A



IC101, 201, 301, 401
IC102, 202, 302, 402
IC103, 203, 303, 403
IC151, 251, 351, 451
IC152, 252, 352, 452

: TA-7122AP

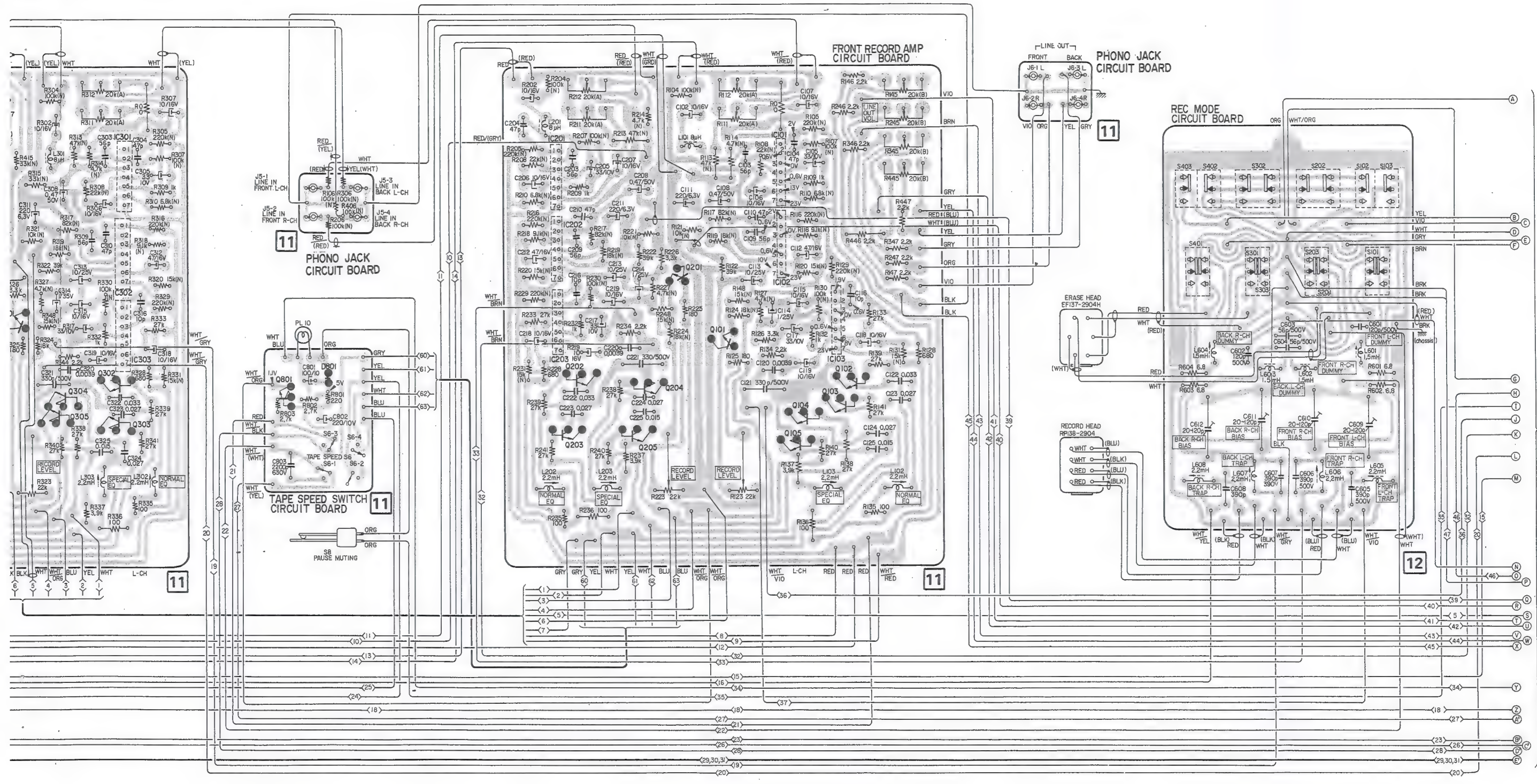


D801: 1S2076

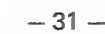


Q301	Q304	Q302
R323	L303	L302

Q	Q202	Q204	Q201	Q101	Q104	Q102
D	Q203	Q205			Q105	Q103
ADJ	R212	R223		R123		R145
	R211					R245
						R445

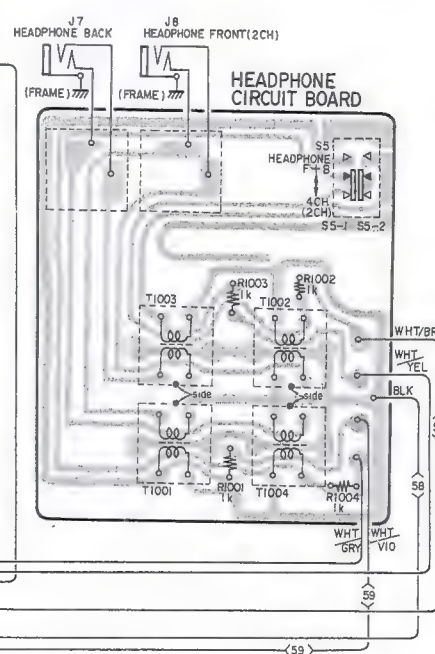
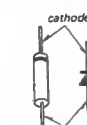


To Page 30



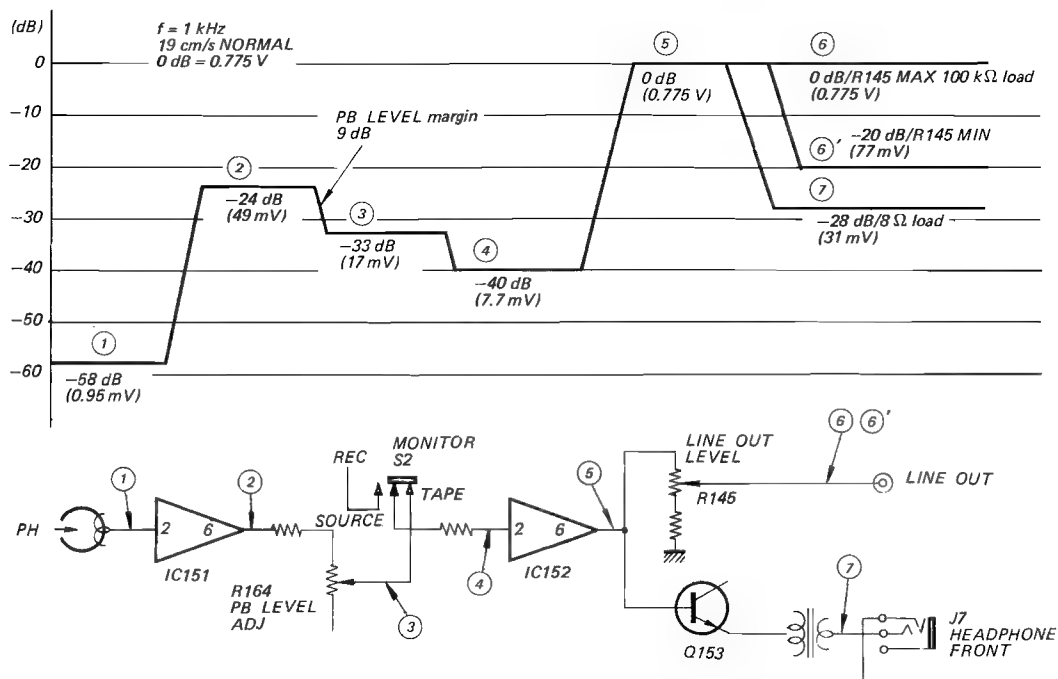
Q	Q351 Q352	Q353		Q451 Q452
D	D351 D352			D451 D452
ADJ	R357	R364 R374	R464	R457

D901 } : SIB01-02
D902 }
D903 }

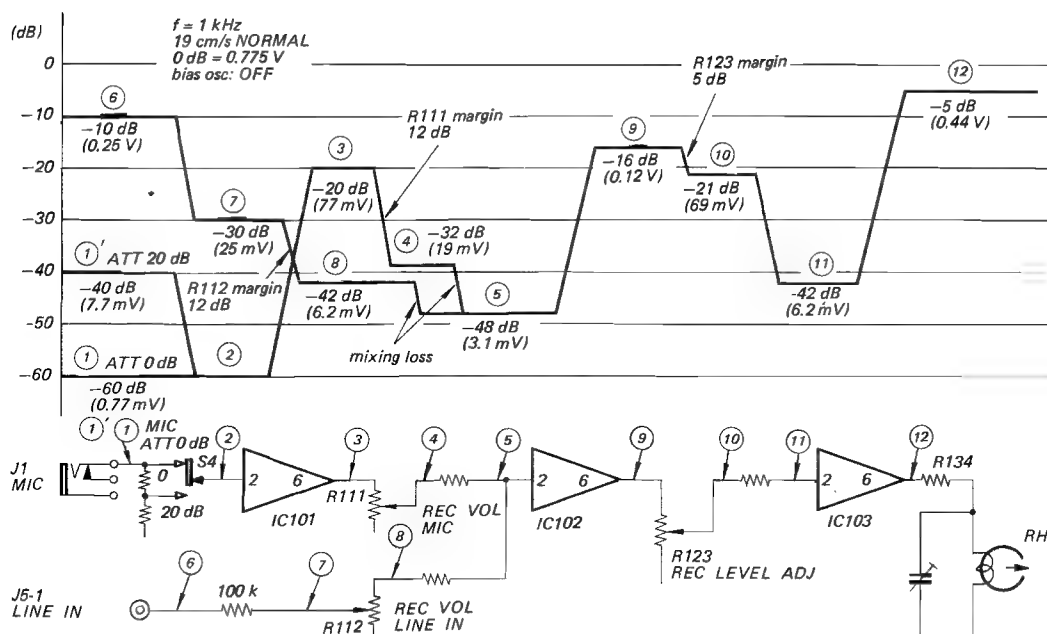

$$\left. \begin{array}{l} D151, 251, 351, 451 \\ D152, 252, 352, 452 \end{array} \right\} : 1T22$$


4-3. LEVEL DIAGRAMS

Playback



Record

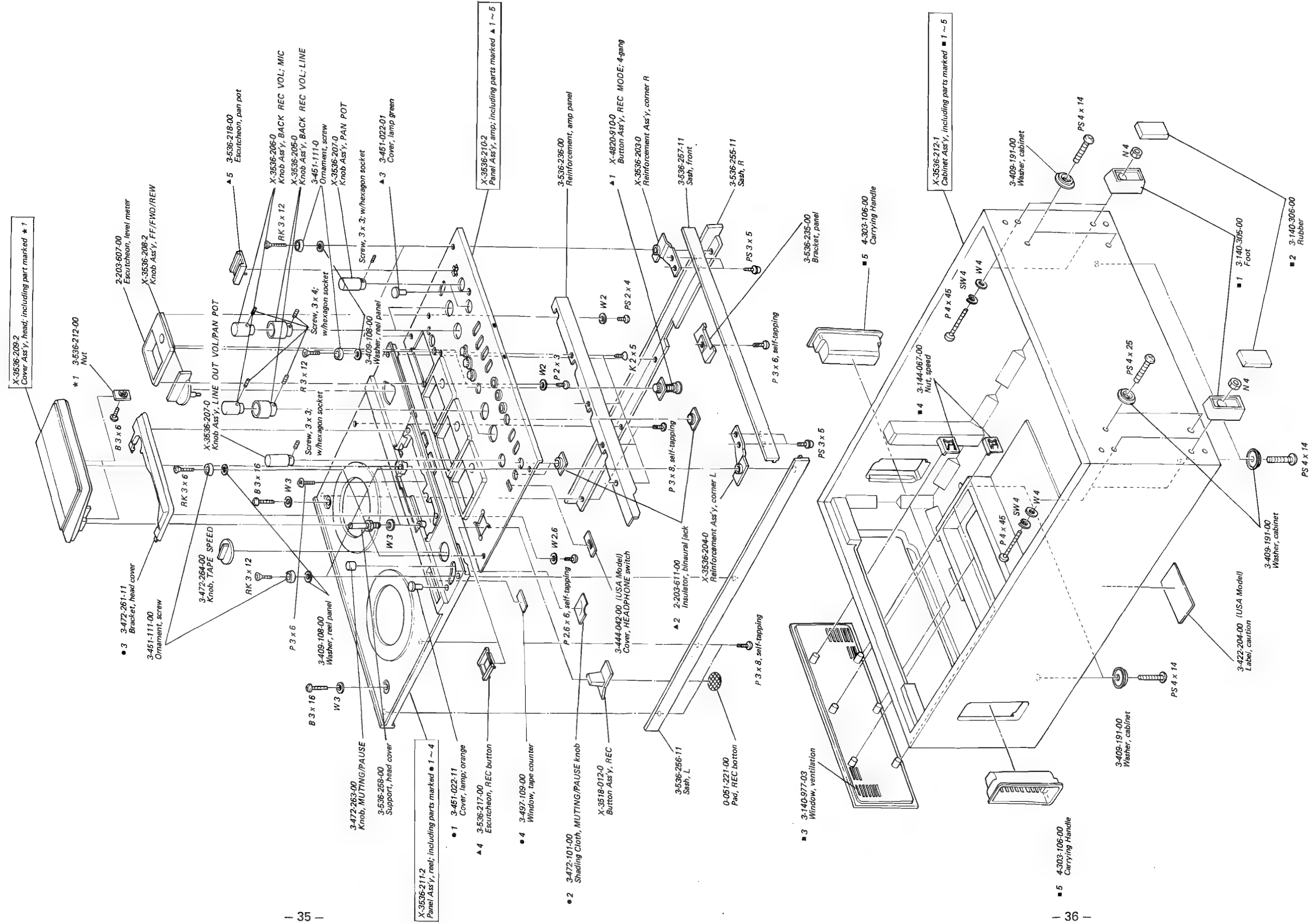


MEMO

A single black dot is located on the left margin of the page.

EXPLODED VIEWS

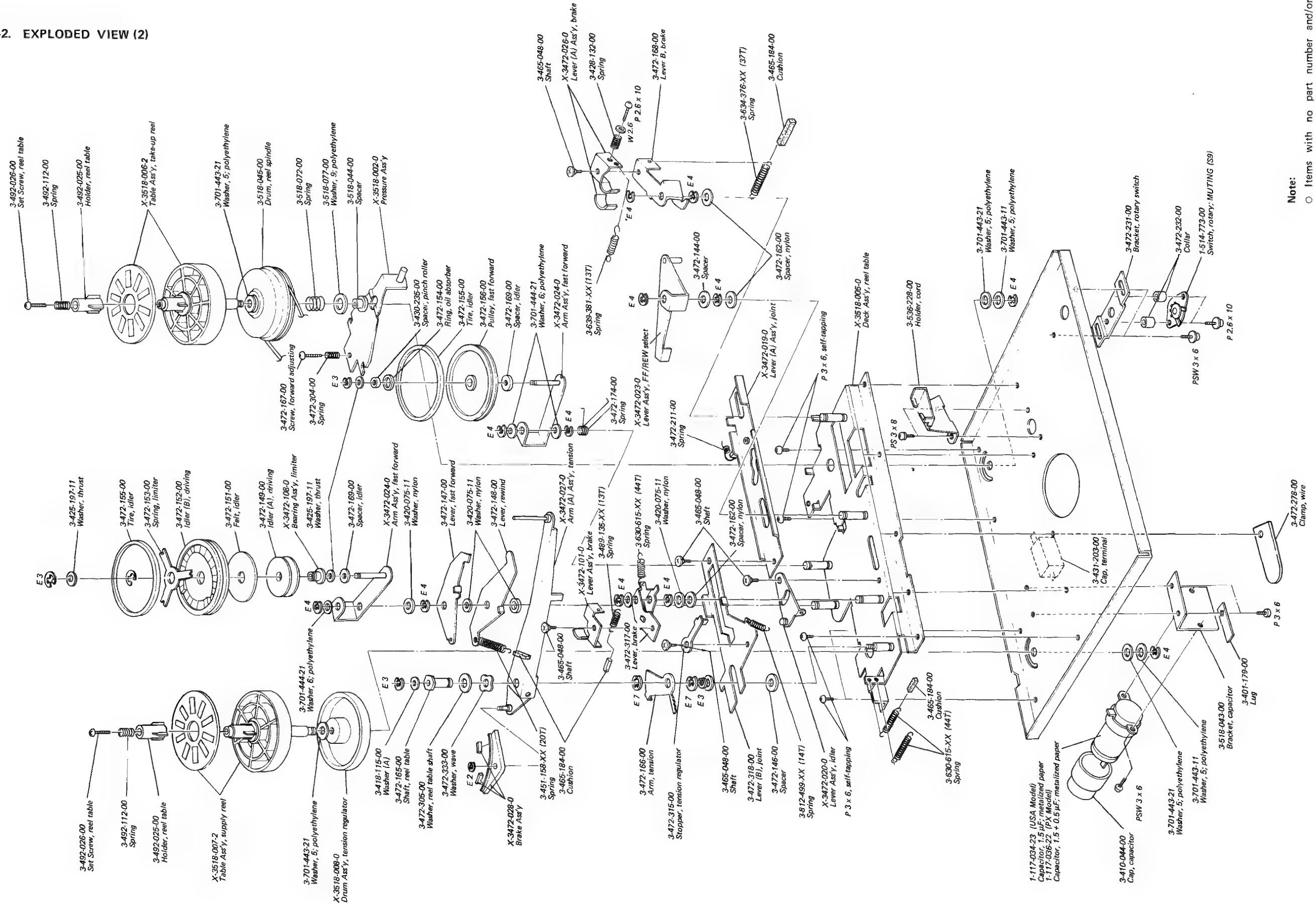
5-1. EXPLODED VIEW (1)



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head

5-2. EXPLODED VIEW (2)



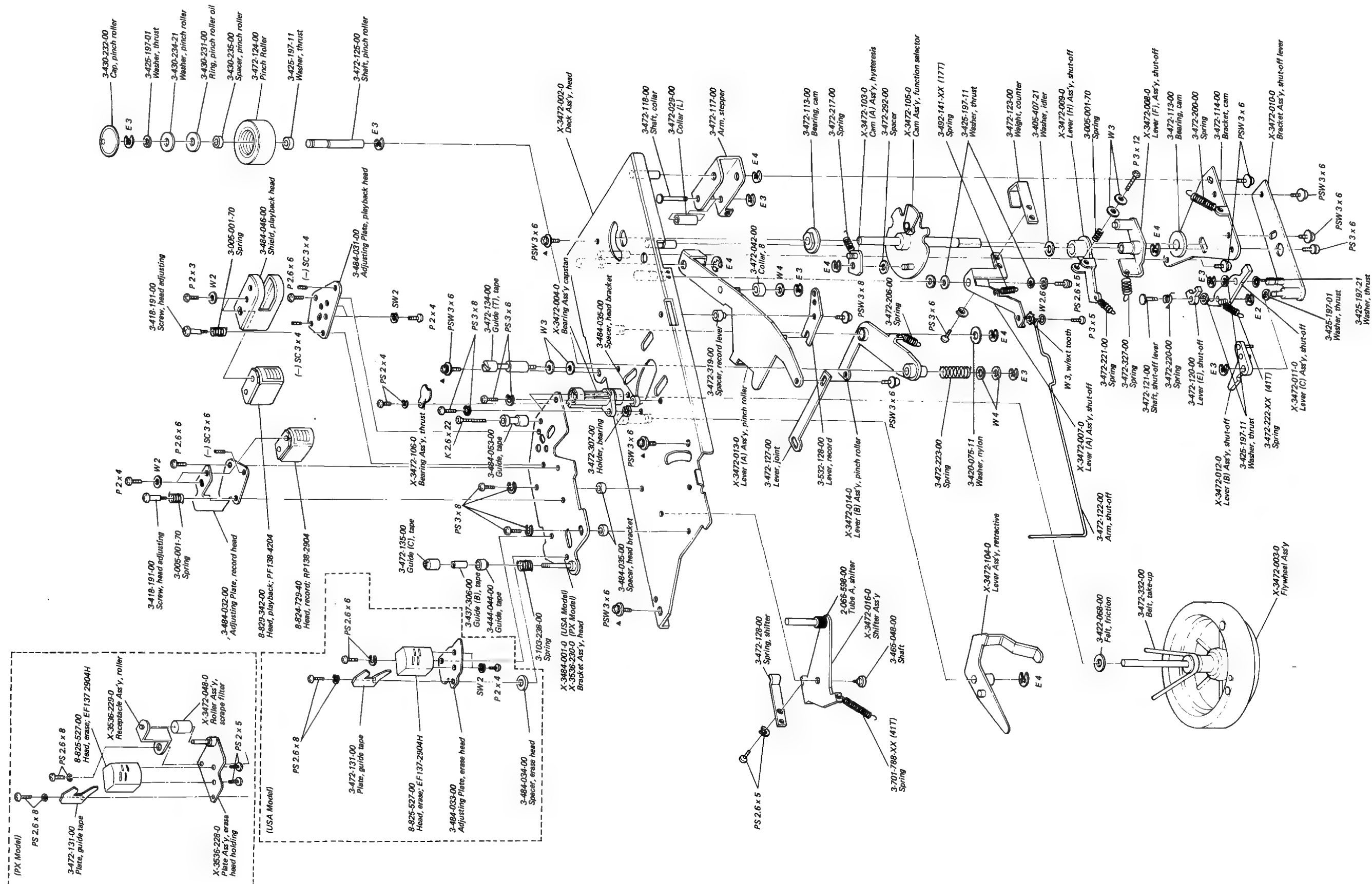
Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head
- (□□T) shows the number of coils in spring.

[illegible]

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head
- (□□T) shows the number of coils in spring.

5-4. EXPLODED VIEW (4)



Note:

- Note:**
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
 - All screws are Phillips (cross recess) type unless otherwise noted.
(—) = slotted head
 - (□□□) shows the number of coils in spring.

[illegible]

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head
- (COT) shows the number of coils in spring.

SECTION 6

PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
COMPLETE CIRCUIT BOARDS		
	X-3536-214-1	MONITOR
	X-3536-215-1	Pan pot
	X-3536-216-1	TAPE SPEED switch
	X-3536-217-1	PAN POT switch
	X-3536-218-1	MIC jack
	X-3536-220-1	Power supply
	X-3536-221-1	HEADPHONE
	X-3536-222-1	Bias Osc
	X-3536-223-1	Front Playback
	X-3536-224-1	Back Playback
	X-3536-225-1	Back Record
	X-3536-226-1	Front Record
	X-3536-227-1	REC MODE
PRINTED CIRCUIT BOARD		
	1-582-835-00	Printed Circuit Board, phono jack
	1-582-912-00	Printed Circuit Board, phono jack
	1-582-834-00	Meter
SEMICONDUCTORS		
Q101, 201)	Transistor	2SC634A
Q301, 401)		
Q102, 202)	Transistor	2SC634A
Q302, 402)		
Q103, 203)	Transistor	2SC634A
Q303, 403)		
Q104, 204)	Transistor	2SC634A
Q304, 404)		
Q105, 205)	Transistor	2SC634A
Q305, 405)		
Q151, 251)	Transistor	2SC634A
Q351, 451)		
Q152, 252)	Transistor	2SC634A
Q352, 452)		
Q153, 253)	Transistor	2SC634A
Q353, 453)		
Q701	Transistor	2SC1475
Q702	Transistor	2SC1475
Q801	Transistor	2SC634A
IC101, 201)	Integrated Circuit	TA-7122AP
IC301, 401)		
IC102, 202)	Integrated Circuit	TA-7122AP
IC302, 402)		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
IC103, 203)	Integrated Circuit	TA-7122AP
IC303, 403)		
IC151, 251)	Integrated Circuit	TA-7122AP
IC351, 451)		
IC152, 252)	Integrated Circuit	TA-7122AP
IC352, 452)		
IC901	Integrated Circuit	BX-252
D151, 251)	Diode	1T22
D351, 451)		
D152, 252)	Diode	1T22
D352, 452)		
D801	Diode	1S2076
D901	Diode	SIB01-02
D902	Diode	SIB01-02
D903	Diode	SIB01-02
COILS		
L101, 201)	1-407-519-00	8 μ H, microinductor
L301, 401)		
L102, 202)	1-407-269-00	2 mH, variable inductor
L302, 402)		
L103, 203)	1-407-269-00	2 mH, variable inductor
L303, 403)		
L151, 251)	1-407-658-00	35 mH, microinductor
L351, 451)		
L601	1-407-268-00	1.5 mH, variable inductor
L602	1-407-268-00	1.5 mH, variable inductor
L603	1-407-268-00	1.5 mH, variable inductor
L604	1-407-268-00	1.5 mH, variable inductor
L605	1-407-268-00	2.2 mH, variable inductor
L606	1-407-268-00	2.2 mH, variable inductor
L607	1-407-268-00	2.2 mH, variable inductor
L608	1-407-268-00	2.2 mH, variable inductor
L701	1-407-198-21	2.2 mH, microinductor
L702	1-407-198-21	2.2 mH, microinductor
TRANSFORMERS		
T1	1-442-252-00	Power (USA Model)
T1	1-442-344-00	Power (PX Model)
T701	1-443-171-00	Bias Osc
T1001	1-427-270-00	Headphone (USA Model)
T1004	1-427-270-XX	Headphone (PX Model)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CAPACITORS		
All capacitors are in μ F unless otherwise indicated. p = μ F elect = electrolytic		
C1	1-117-034-23	1.5 metalized paper (USA Model)
C1	1-117-036-22	1.5 + 0.5 metalized paper (PX Model)
C2	1-105-759-12	0.033 200 V mylar
C101, 201)	1-101-455-11	0.001 50 V ceramic
C301, 401)		
C102, 202)	1-121-651-11	10 16 V elect
C302, 402)		
C103, 203)	1-107-125-11	56 p 50 V silvered mica
C303, 403)		
C104, 204)	1-107-123-11	47 p 50 V silvered mica
C304, 404)		
C105, 205)	1-121-402-11	33 10 V elect
C305, 405)		
C106, 206)	1-121-651-11	10 16 V elect
C306, 406)		
C107, 207)	1-121-651-11	10 16 V elect
C307, 407)		
C108, 208)	1-121-726-11	0.47 50 V elect
C308, 408)		
C109, 209)	1-107-125-11	56 p 50 V silvered mica
C309, 409)		
C110, 210)	1-107-123-11	47 p 50 V silvered mica
C310, 410)		
C111, 211)	1-121-419-11	220 6.3 V elect
C311, 411)		
C112, 212)	1-121-409-11	47 16 V elect
C312, 412)		
C113, 213)	1-121-748-11	10 25 V elect
C313, 413)		
C114, 214)	1-131-236-21	1 25 V tantalum
C314, 414)		
C115, 215)	1-121-651-11	10 16 V elect
C315, 415)		
C116, 216)	1-107-107-11	10 p 50 V silvered mica
C316, 416)		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C117, 217)	1-121-402-11	33 10 V elect
C317, 417)		
C118, 218)	1-121-651-11	10 16 V elect
C318, 418)		
C119, 219)	1-121-651-11	10 50 V elect
C319, 419)		
C120, 220)	1-105-508-12	0.0039 50 V mylar
C320, 420)		
C121, 221)	1-107-181-11	330 p 500 V silvered mica
C321, 421)		
C122, 222)	1-105-519-12	0.033 50 V mylar
C322, 422)		
C123, 223)	1-105-518-12	0.027 50 V mylar
C323, 423)		
C124, 224)	1-105-518-12	0.027 50 V mylar
C324, 424)		
C125, 225)	1-105-515-121	0.015 50 V mylar
C325, 425)		
C151, 251)	1-121-410-11	47 25 V elect
C351, 451)		
C152, 252)	1-105-821-12	0.001 50 V mylar
C352, 452)		
C153, 253)	1-107-107-11	10 p 50 V silvered mica
C353, 453)		
C154, 254)	1-105-516-12	0.018 50 V mylar
C354, 454)		
C155, 255)	1-121-402-11	33 10 V elect
C355, 455)		
C156, 256)	1-121-651-11	10 16 V elect
C356, 456)		
C157, 257)	1-121-748-11	10 25 V elect
C357, 457)		
C158, 258)	1-107-071-11	27 p 50 V silvered mica
C358, 458)		
C159, 259)	1-107-234-11	470 p 50 V silvered mica
C359, 459)		
C160, 260)	1-121-651-11	10 16 V elect
C360, 460)		
C161, 261)	1-121-402-11	33 10 V elect
C361, 461)		
C162, 262)	1-121-651-11	10 16 V elect
C362, 462)		

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>			
C163, 263 C363, 463	1-121-651-11	10	16 V	elect	
C164, 264 C364, 464		100	35 V	elect	
C165, 265 C365, 465		4.7	25 V	elect	
C166, 266 C366, 466	1-121-391-11	1	50 V	elect	
C601	1-107-171-11	120 p	500 V	silvered mica	
C602	1-107-171-11	120 p	500 V	silvered mica	
C603	1-107-165-11	56 p	500 V	silvered mica	
C604	1-107-165-11	56 p	500 V	silvered mica	
C605	1-107-183-11	390 p	500 V	silvered mica	
C606	1-107-183-11	390 p	500 V	silvered mica	
C607	1-107-183-11	390 p	500 V	silvered mica	
C608	1-107-183-11	390 p	500 V	silvered mica	
C609	1-141-069-00	20 p ~ 120 p		trimmer	
C610	1-141-069-00	20 p ~ 120 p		trimmer	
C611	1-141-069-00	20 p ~ 120 p		trimmer	
C612	1-141-069-00	20 p ~ 120 p		trimmer	
C701	1-129-706-11	2200 p	630 V	polypropylene	
C702	1-105-512-12	0.0082	50 V	mylar	
C703	1-105-501-12	0.001	50 V	mylar	
C704	1-105-501-12	0.001	50 V	mylar	
C705	1-105-518-12	0.027	50 V	mylar	
C706	1-121-392-11	3.3	25 V	elect	
C707	1-121-398-11	10	25 V	elect	
C801	1-121-414-11	100	10 V	elect	
C802	1-121-420-11	220	10 V	elect	
C803	1-129-706-11	2200 p	630 V	polypropylene	
C901	1-121-388-11	1000	35 V	elect	
C902	1-121-261-11	220	35 V	elect	
C903	1-121-388-11	1000	35 V	elect	
C904	1-121-411-11	47	50 V	elect	
C905	1-121-810-11	470	50 V	elect	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
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RESISTORS

All resistors are in Ω . $\frac{1}{4}$ W, Regular type carbon and composition resistors are omitted. Check schematic diagram for resistance values. (k = 1000, M = 1000k)

R111, 211 R311, 411	1-224-381-00	20 k (A), variable; 2-gang
R112, 212 R312, 412		20 k (A), variable; 2-gang
R123, 223 R322, 422	1-222-764-00	22 k, adjustable
R145, 245 R345, 445	1-224-380-00	20 k (B), variable; 4-gang
R157, 257 R357, 457		4.7 k, adjustable
R164, 264 R364, 464	1-222-775-00	22 k, adjustable
R174, 274 R374, 474	1-222-773-00	4.7 k, adjustable
R501, 511 R504, 514	1-224-382-00	5 k (B), variable; 2-gang
	1-224-382-00	5 k (B), variable; 2-gang
R901	1-244-835-11	27 $\frac{1}{2}$ W
R903	1-244-817-11	4.7 $\frac{1}{2}$ W

SWITCHES

S1	1-514-978-21	Slide, record/playback
S2	1-516-446-00	Lever, MONITOR
S3	1-516-024-00	Slide, PAN POT
S4	1-516-447-00	Lever slide, FRONT MIC ATT
S5	1-514-448-00	Slide, HEADPHONE
S6	1-516-449-00	Rotary, TAPE SPEED
S7	1-516-447-00	Lever slide, TAPE SELECT
S8	1-514-697-00	Leaf, PAUSE MUTING
S9	1-514-773-00	Rotary, MUTING
S10	1-514-817-41	Slide, POWER (PX Model)
	1-516-023-11	Slide, POWER (USA Model)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
S11	1-514-039-12	Micro, motor shout-off
S12	1-514-231-00	Micro, bias timing

S101, 201 S203, 301 S401, 303 S102, 103 S202, 302 S402, 403	1-514-907-00	Slide, REC MODE
	1-514-906-00	Push, REC MODE

JACKS

J1	1-507-476-XX	Phone, MIC; front L
J2	1-507-476-XX	Phone, MIC; front R
J3	1-507-476-XX	Phone, MIC; back L
J4	1-507-476-XX	Phone, MIC; back R
J5	1-536-352-00	Phono, LINE IN
J6	1-536-352-00	Phono, LINE OUT
J7	1-507-476-XX	Binaural, HEADPHONE, front
J8	1-507-476-XX	Binaural, HEADPHONE, back

MISCELLANEOUS

CNP1	1-506-312-00	Connector, joint terminal
CNJ1	1-507-323-00	Connector, joint terminal
CP1	1-101-534-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (USA Model)
	1-231-057-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (PX Model)
CP2	1-101-534-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (USA Model)
	1-231-057-31	Encapsulated Component, C-R; 0.1 μ F + 120 Ω (PX Model)
F	1-532-134-00	Fuse (PX Model)
M	8-832-624-09	Motor, IC624H1
ME1	1-520-179-00	Meter, level
ME2	1-520-179-00	Meter, level

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
ME3	1-520-179-00	Meter, level
ME4	1-520-179-00	Meter, level

PL1 PL2 PL3 PL4		Included in ME 1, 2, 3, 4
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PL5	1-518-115-XX	Lamp, record; FL
PL6	1-518-115-XX	Lamp, record; FR
PL7	1-518-115-XX	Lamp, record; BL
PL8	1-518-115-XX	Lamp, record; BR
PL9	1-518-115-XX	Lamp, pan pot

PL10	1-518-115-XX	Lamp, pause muting
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1-509-427-00	Voltage Selector (PX Model)
1-533-102-XX	Holder, fuse (PX Model)
1-534-487-XX	Cord, power (PX Model)
1-534-538-21	Cord, power (USA Model)
1-536-376-00	Terminal strip; 1L1
8-824-729-40	Head, record; RP138-2904
8-825-527-00	Head, erase; EF137-2904H
8-829-342-40	Head, playback; PP138-4204

ACCESSORIES


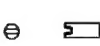
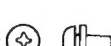



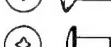
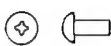

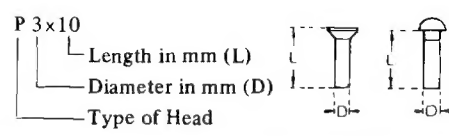
<u>Part No.</u>	<u>Description</u>
X-2440-015-0	Reel Ass'y, R-7ES (USA Model)
X-2440-015-1	Reel Ass'y, R-7ES (PX Model)
X-3701-018-2	Tips Ass'y, cleaning (PX Model)
1-534-049-31	Cord, connection (RK-74) (USA Model)
1-534-049-51	Cord, connection (RK-74) (PX Model)
3-401-193-00	Cleaning Ribbon (USA Model)
3-518-067-01 ~ 61	Pulley, motor (PX Model)
3-518-068-01 ~ 61	Pulley, motor
3-780-340-21	Manual, instruction (USA Model)
3-780-340-61	Manual, instruction (PX Model)
8-918-222-11	Tape, demonstration; DSE-4721

SECTION 7

HARDWARE

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
SCREWS			
All screws are Phillips type (cross recess type) unless otherwise indicated.			
7-621-259-45	P 2.6 x 6	7-682-950-01	PSW 3 x 12
7-621-259-55	P 2.6 x 8	7-683-140-20	3 x 6, cone point
7-621-259-65	P 2.6 x 10	7-683-141-21	3 x 8, cone point
7-621-560-22	K 2.6 x 22	7-683-237-31	3 x 3, hexagon socket
7-621-729-79	P 2.6 x 6, self-tapping	7-683-238-31	3 x 4, hexagon socket
		7-683-242-31	3 x 10, cone point
		7-685-145-31	P 3 x 6, self-tapping
		7-685-146-21	P 3 x 8, self-tapping
		WASHERS	
7-628-154-15	PS 2.6 x 6	7-623-104-11	1.7 (middle)
7-628-254-05	PS 2.6 x 5	7-623-107-05	2.6 (small)
7-682-123-01	P 2 x 3	7-623-107-18	2.6
7-682-146-01	P 3 x 5	7-623-107-19	2.6 (middle)
7-682-150-01	P 3 x 12	7-623-108-08	3 (small)
7-682-171-01	P 4 x 45	7-623-108-09	3 (small)
7-682-253-92	P 2.6 x 4	7-623-108-11	3 (middle)
7-682-254-32	P 2.6 x 10	7-623-108-21	3 (large)
7-682-347-04	RK 3 x 6	7-623-110-08	4 (small)
7-682-350-04	RK 3 x 12	7-623-110-18	4 (middle)
7-682-547-05	B 3 x 6	7-623-408-01	3, w/ext. tooth
7-682-552-04	B 3 x 16		
7-682-624-01	PS 2 x 4	RETAINING RINGS	
7-682-626-01	PS 3 x 6	7-624-104-01	E2
7-682-645-01	PS 3 x 4	7-624-106-01	E3
7-682-646-01	PS 3 x 5	7-624-108-01	E4
7-682-647-01	PS 3 x 6	7-624-109-01	E5
7-682-648-01	PS 3 x 8	7-624-111-01	E7
7-682-652-01	PS 3 x 16	7-624-112-01	E8
7-682-660-01	PS 4 x 6		
7-682-667-01	PS 4 x 25	7-623-508-01	Lug, 3
7-682-947-01	PSW 3 x 6		
7-682-948-01	PSW 3 x 6		

Hardware Nomenclature

P – Pan Head Screw		SC – Set Screw	
PS – Pan Head Screw with Spring Washer		E – Retaining Ring (E Washer)	
K – Flat Countersunk Head Screw		W – Washer	
B – Binding Head Screw		SW – Spring Washer	
RK – Oval Countersunk Head Screw		LW – Lock Washer	
T – Truss Head Screw		N – Nut	
R – Round Head Screw		<div><p>– Example –</p><div><div>P 3 x 10</div><div>Length in mm (L)</div><div>Diameter in mm (D)</div><div>Type of Head</div></div><div></div></div>	
F – Flat Fillister Head Screw			

